Troubleshooting Manual

Models
T350
T500J

3121203

September 7, 2005

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NQA ISO9001 REGISTERED COMPANY UKAS QUALITY MANAGEMENT 015

JLG®

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SECTION 1. TROUBLESHOOTING BY FUNCTION

1.1 ALL FUNCTIONS INOPERATIVE

Step	Pretest Instructions	Test	Result	Corrective Action
1.1.1		Basic check of likely causes		Possible Causes: 4.1.66, 4.1.67, 4.1.68
1.1.2		Do panel indicator lights blink at power-on?	Yes No	Go to step 1.1.3 Ground controller not powered. Perform component check: 3.2 DC Powered Machine - Power or 3.7 Engine Powered Machine - Power
1.1.3		Try both ground and platform controls	One set of controls functions Both sets of control inoperable	See 1.10 Ground Controls Inoperative or 1.11 Platform Controls Inoperative Go to step 1.1.4
1.1.4		Is the hydraulic pump motor running while activating a function?	Yes No	Go to step 1.1.5 Perform component check: 3.1 DC Powered Machine - Hydraulic Pump or 3.6 Engine Powered Machine - Hydraulic Pump
1.1.5	Connect a 0-5000 PSI pressure gauge at the manifold "G" port	While holding enable and lift up switch, does pressure rise above 100PSI (minimum function pressure)?	Yes No	Possible Causes: 4.1.37, 4.1.47 Go to step 1.1.6
1.1.6	Plumb a 0 to 5000 PSI (345 bar) pressure gauge into the manifold P port	While holding enable and lift up switch, does pressure rise above 100PSI (minimum function pressure)?	Yes No	Possible Causes: 4.1.40, 4.1.10, 4.1.47 Possible Causes: 4.1.37, 4.1.45, 4.1.74, 4.1.75, 4.1.39

1.2 PUMP MOTOR WILL NOT OPERATE - DC POWERED MODELS

Step	Pretest Instructions	Test	Result	Corrective Action
1.2.1		Voltage between B+ and B- (X102 and X101) = Vbatt?	Yes No	Go to step 1.2.2 See 3.2 DC Powered Machine - Power
1.2.2	Engage enable and lift up switch	Voltage between M1 and M2 (X103 and X104) = Vbatt?	Yes No	Go to step 1.2.3 Possible Causes: 4.1.12
1.2.3	Engage enable and lift up switch	Voltage between X115 and X114 = Vbatt?	Yes No	Possible Causes: 4.1.69 Go to step 1.2.4
1.2.4	Engage enable and lift up switch	Voltage between X115 and X101 = Vbatt?	Yes No	Go to step 1.2.5 Possible Causes: 4.1.70, 4.1.72, 4.1.12
1.2.5	Engage enable and lift up switch	Voltage between X114 and X102 = Vbatt?	Yes No	Possible Causes: 4.1.12 Possible Causes: 4.1.71, 4.1.72, 4.1.12

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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

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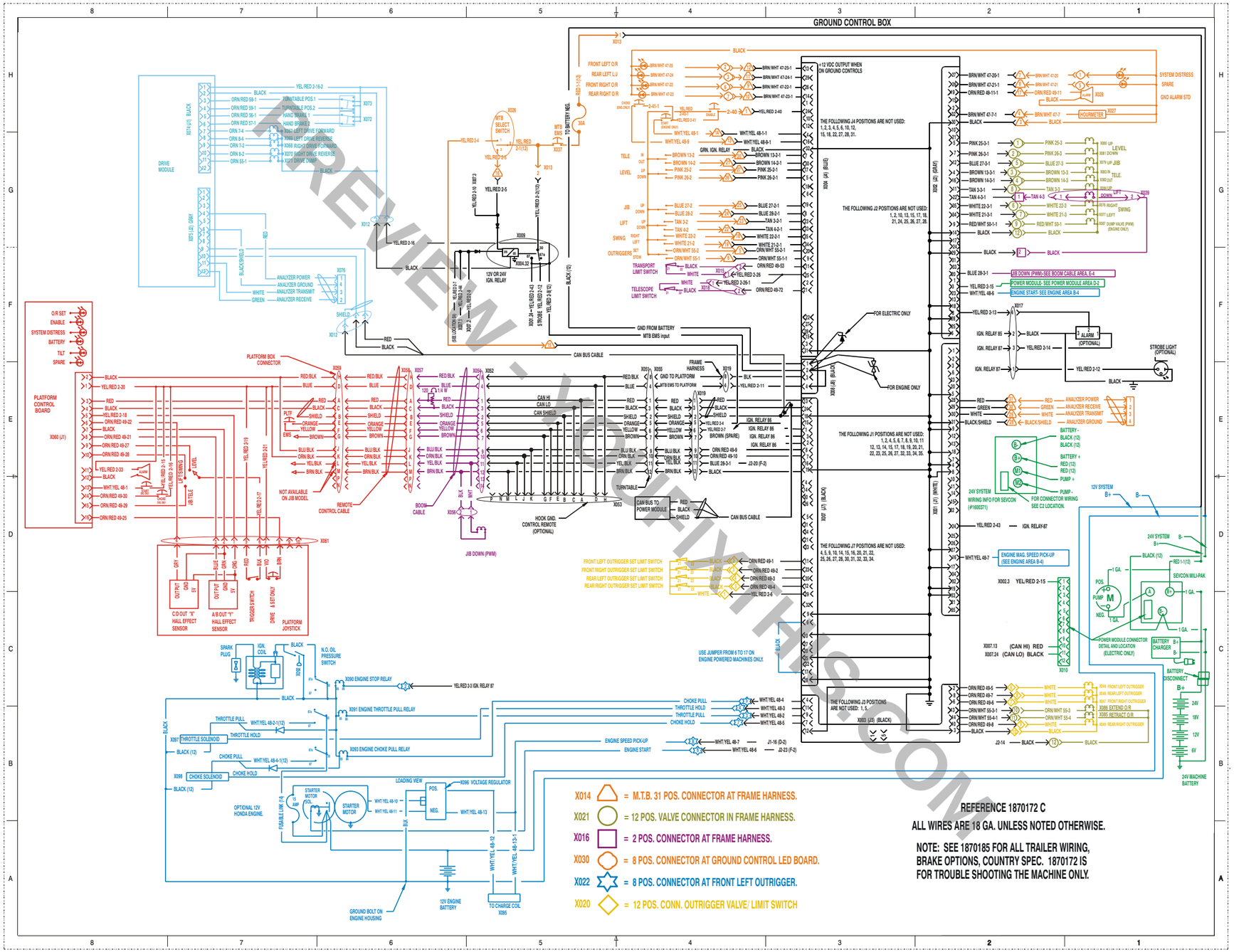


Figure 7-3. Electrical Schematic

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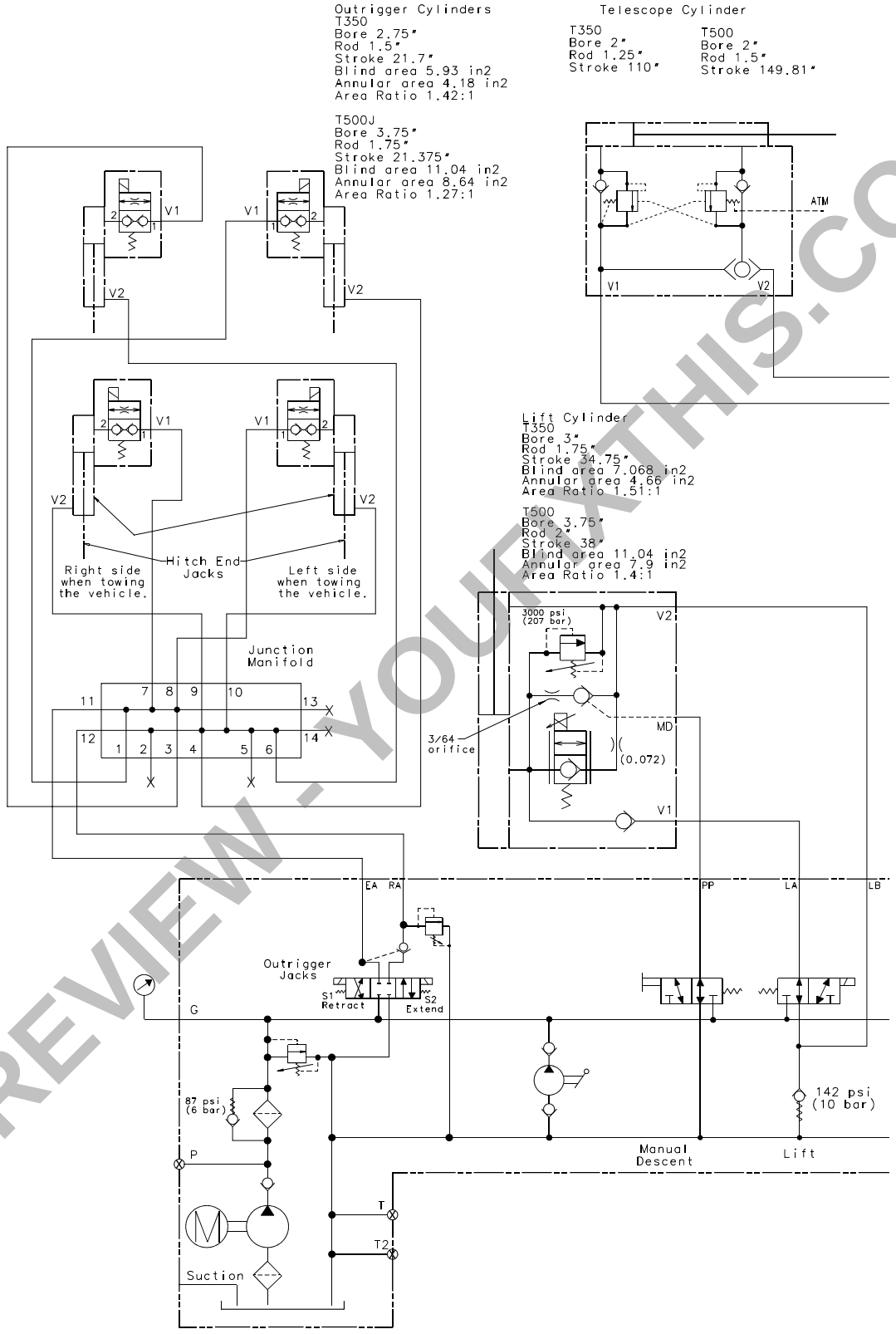


Figure 8-2. Hydraulic Schematic - Electric Powered Machines (Sheet 1 of 2)

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7.2 GROUND MODULE CONNECTOR PINOUTS

Table 7-2. X001 (J1) Ground Module Pinout

PIN	T-SERIES FUNCTION	TYPE	I/O	RANGE (V)
1	Depopulated	-	-	-
2	Depopulated	-	-	-
3	Depopulated	-	-	-
4	GROUND	Power	Output	0VDC
5	GROUND	Power	Output	0VDC
6	Depopulated	-	-	-
7	Depopulated	-	-	-
8	GROUND	Power	Output	0VDC
9	GROUND	Power	Input	0VDC
10	Depopulated	-	-	-
11	Depopulated	-	-	-
12	Depopulated	-	-	-
13	Depopulated	-	-	-
14	NOT USED	Analog	Input	-
15	NOT USED	Analog	Input	-
16	ENGINE MAGNETO (SPEED PICKUP)	Digital	Input	AC Coupled Freq.
17	GROUND	Power	Output	0VDC
18	GROUND	Power	Output	0VDC
19	GROUND	Power	Output	0VDC
20	Depopulated	-	-	-
21	NOT USED	Digital	Input	-
22	Depopulated	Digital	Output	-
23	Depopulated	-	-	-
24	CONSTANT BATTERY	Power	Input	12VDC
25	Depopulated	-	-	-
26	Depopulated	-	-	-
27	GROUND	Power	Output	0VDC
28	ANALYZER POWER	Power	Output	9.5VDC
29	RS-232 RECEIVE	Serial	Input	Digital Comm.
30	RS-232 TRANSMIT	Serial	Output	Digital Comm.
31	ANALYZER RETURN	Power	Output	0VDC
32	Depopulated	Power	Output	
33	GROUND	Power	Output	0VDC
34	NOT USED	Digital	Input	-
35	ELECTRIC POWER MODE (FUTURE)	Digital	Input	-

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A.10 CONTROL MODULE POWER

Always make sure that the ground control module is properly powered.

1. For Ground operation, Pins J001.24, X007.3, and X008.2 should have a voltage of Vbatt. Pin X008.1 should be grounded.
2. For Platform operation, Pins J001.24, X007.1, X007.2, X008.2, and X060.1 should have a voltage of Vbatt. Pins X008.1 and X060.2 should be grounded.

CAN communication wires should have 60 Ohms resistance between CAN HI and CAN LO whenever connected or 120 Ohms when disconnected. A CAN termination 120 Ohm resistor is located at both ends of the CAN bus. One is in the wire harness near the platform at X057. The other terminator is embedded in the power module for electric powered machines or the ground module for engine powered machines. The jumper in the engine powered machine harness between X007.6 and X007.17 enables the ground module termination resistor.

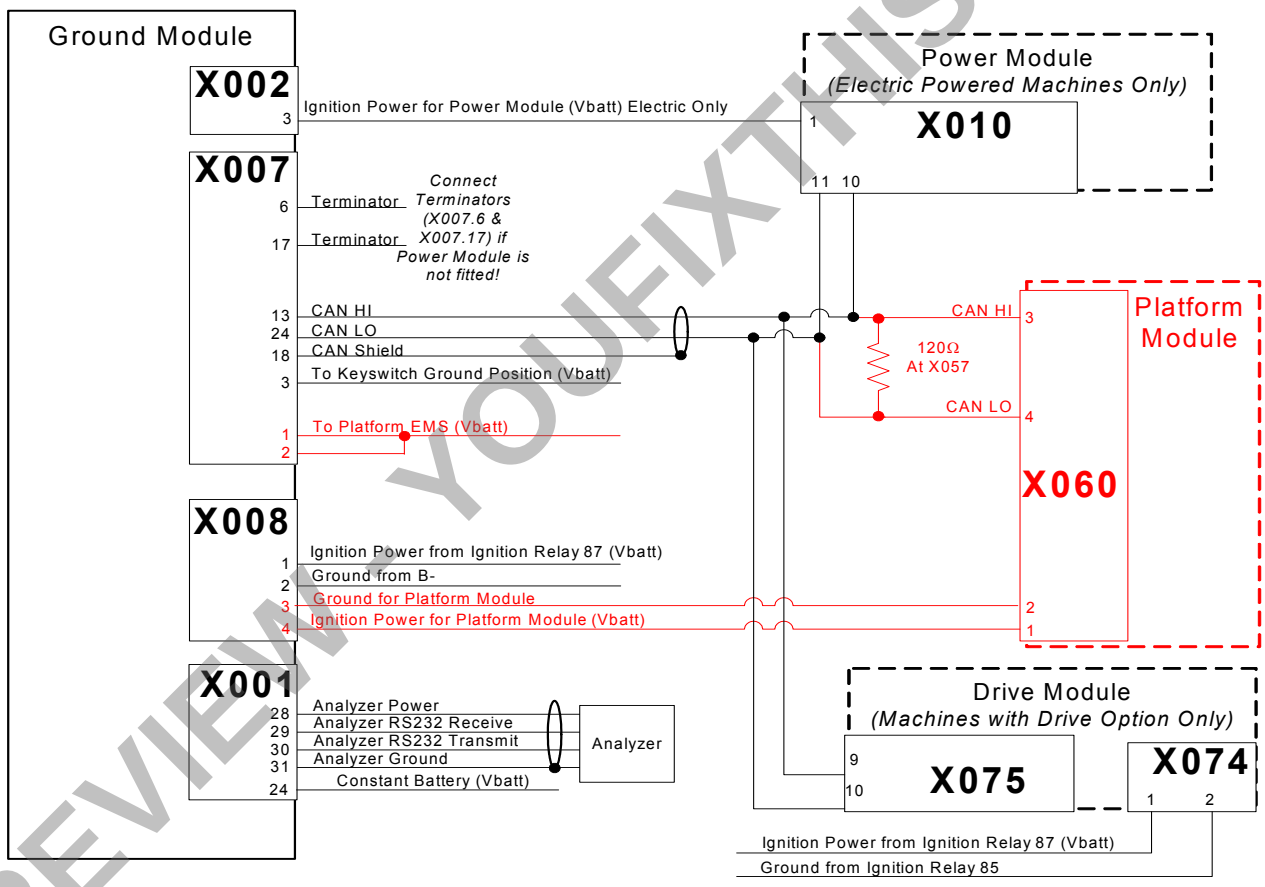


Figure A-4. Basic Electronic Module Connections

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SECTION 11. SPECIFICATIONS

11.1 INTRODUCTION

This section of the manual provides additional necessary information to the operator for proper operation and maintenance of this machine.

Other Publications Available:

T350 & T500J Operation and Safety Manual 3121197

T350 Service and Maintenance Manual 3121198

T500J Service and Maintenance Manual 3121200

T350 & T500J Illustrated Parts Manual..... 3121199

11.2 OPERATING SPECIFICATIONS

MODEL	T350	T500J
Tongue Weight (ANSI):	252 lbs. (114 kg)	350 lbs. (154 kg)
Maximum Allowable Tow Speed: (Do NOT exceed legal speed limit)	65 mph (105 kph)	65 mph (105 kph)
Maximum Work Load (Capacity) w/Rotator	440 lbs. (200 kg)	440 lbs. (200 kg)
Maximum Work Load (Capacity) w/o Rotator	500 lbs. (230 kg)	500 lbs. (230 kg)
Maximum Work Load (Capacity) w/Rotator & Panel Tray	320 lbs. (145 kg)	320 lbs. (145 kg)
Maximum Work Load (Capacity) w/o Rotator & w/Panel Tray	350 lbs. (158 kg)	350 lbs. (158 kg)
Material Hook Capacity (Optional)	500 lbs. (230 kg)	500 lbs. (230 kg)
Accessory Tray Capacity	250 lbs.* (114 kg)	250 lbs.* (114 kg)
Panel Tray Capacity (w/Rotator)	70 lbs. (32 kg)	70 lbs. (32 kg)
Panel Tray Capacity (w/o Rotator)	100 lbs. (45 kg)	100 lbs. (45 kg)
Swing	410° non-continuous	410° non-continuous
Max.Vertical Platform Height (Unrestricted)	35 ft. (10.6 m)	50 ft. (15.2 m)
Vertical Reach (unrestricted)	35 ft. (10.4 m)	50 ft. (15.2 m)
Horizontal Reach (from centerline of machine) (from outrigger pad edge)	 20 ft. (6.1 m) 14 ft. (4.27 m)	 31 ft. (9.45 m) 25 ft. (7.62 m)
Up and Over Clearance	15 ft. (4.57 m)	18 ft. (5.49 m)
Maximum Outrigger Load	1950 lbs. (884.5 kg)	2660 (1206.5 kg)
Maximum Ground Bearing Pressure	22.5 psi (1.58 kg/cm^2)	30.7 psi (2.15 kg/cm^2)
Maximum Travel Gradeability	20%	20%
Maximum Sideslope	11°	11°
Max. Hydraulic System Pressure	2700 psi (186 Bar)	2950 psi (203 Bar)
Maximum Operating Wind Speed	28 mph (12.5 m/s)	28 mph (12.5 m/s)
Maximum Horizontal Manual Force	90 lb. force (400 N)	90 lb. force (400 N)
Electrical System Voltage - Electric Machine	24 volts	24 Volts
Electrical System Voltage - Gas Machine	12 volts	12 Volts
Gross Machine Weight (Platform Empty)	3330 lbs. (1510 kg)	4750 lbs. (2155 kg)
* DO NOT exceed axle rating or GVW rating.		

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SECTION B. TROUBLESHOOTING SAFETY PRECAUTIONS

B.1 GENERAL

This section contains the general safety precautions which must be observed during troubleshooting of the aerial platform. It is of utmost importance that maintenance personnel pay strict attention to these warnings and precautions to avoid possible injury to themselves or others, or damage to the equipment. A maintenance program must be followed to ensure that the machine is safe to operate.

⚠ WARNING

MODIFICATION OF THE MACHINE WITHOUT CERTIFICATION BY A RESPONSIBLE AUTHORITY THAT THE MACHINE IS AT LEAST AS SAFE AS ORIGINALLY MANUFACTURED, IS A SAFETY VIOLATION.

The specific precautions to be observed during troubleshooting are inserted at the appropriate point in the manual. These precautions are, for the most part, those that apply when servicing hydraulic and larger machine component parts.

Your safety, and that of others, is the first consideration when engaging in the troubleshooting of equipment. Always be conscious of weight. Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. When raising a portion of the equipment, ensure that adequate support is provided.

⚠ WARNING

SINCE THE MACHINE MANUFACTURER HAS NO DIRECT CONTROL OVER TROUBLESHOOTING, SAFETY IN THIS AREA IS THE RESPONSIBILITY OF THE OWNER/OPERATOR.

B.2 HYDRAULIC SYSTEM SAFETY

It should be noted that the machines hydraulic systems operate at extremely high potentially dangerous pressures. Every effort should be made to relieve any system pressure prior to disconnecting or removing any portion of the system.

B.3 TROUBLESHOOTING SAFETY

⚠ WARNING

FAILURE TO COMPLY WITH SAFETY PRECAUTIONS LISTED IN THIS SECTION MAY RESULT IN MACHINE DAMAGE, PERSONNEL INJURY OR DEATH AND IS A SAFETY VIOLATION.

- NO SMOKING IS MANDATORY. NEVER REFUEL DURING ELECTRICAL STORMS. ENSURE THAT FUEL CAP IS CLOSED AND SECURE AT ALL OTHER TIMES.
- REMOVE ALL RINGS, WATCHES AND JEWELRY WHEN PERFORMING ANY TROUBLESHOOTING.
- DO NOT WEAR LONG HAIR UNRESTRAINED, OR LOOSE-FITTING CLOTHING AND NECKTIES WHICH ARE APT TO BECOME CAUGHT ON OR ENTANGLED IN EQUIPMENT.
- OBSERVE AND OBEY ALL WARNINGS AND CAUTIONS ON MACHINE AND IN SERVICE AND OPERATORS MANUALS.
- KEEP OIL, GREASE, WATER, ETC. WIPED FROM STANDING SURFACES AND HAND HOLDS.
- USE CAUTION WHEN CHECKING A HOT, PRESSURIZED COOLANT SYSTEM.
- NEVER WORK UNDER AN ELEVATED BOOM UNTIL BOOM HAS BEEN SAFELY RESTRAINED FROM ANY MOVEMENT BY BLOCKING OR OVERHEAD SLING, OR BOOM SAFETY PROP HAS BEEN ENGAGED.
- A machine that is damaged or malfunctioning should immediately be tagged and removed from service.
- Repair any machine damage or malfunction before operating the machine.
- Unless otherwise specified, perform any troubleshooting procedure with the machine parked on a flat level surface, boom stowed, key switch off and key removed, park brake applied.
- BATTERY SHOULD ALWAYS BE DISCONNECTEDDURING REPLACEMENT OF ELECTRICAL COMPONENTS.
- KEEP ALL SUPPORT EQUIPMENT AND ATTACHMENTS STOWED IN THEIR PROPER PLACE.
- USE ONLY APPROVED, NONFLAMMABLE CLEANING SOLVENTS.

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REVISION LOG

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2.157 TELESCOPE OUT SOLENOID SHORT TO GROUND

Distress Lamp: 9 ADE Code: 3-3

Telescope Out digital output may be shorted to ground or solenoid may be defective.

Functions Disabled: Telescope Out.

Step	Pretest Instructions	Test	Result	Corrective Action
2.157.1	Disconnect solenoid at X082	Rerun System Test	Analyzer Message "TELESCOPE OUT VALVE OPEN CIRCUIT" Analyzer Message "TELESCOPE OUT VALVE SHORT TO GROUND"	Repair/Replace solenoid Go to step 2.157.2
2.157.2	Remove wire Brown 14-3-1 from X002.16	Rerun System Test	Analyzer Message "TELESCOPE OUT VALVE OPEN CIRCUIT" Analyzer Message "TELESCOPE OUT VALVE SHORT TO GROUND"	Wire Brown 14-3-1 or Brown 14-3 shorted to ground. Repair or replace Possible Cause: 4.1.10

2.158 THROTTLE HOLD SOLENOID OPEN CIRCUIT

Distress Lamp: 9 ADE Code: 3-3

Ground module feedback shows that the Engine Throttle Hold digital output may be disconnected from solenoid or the solenoid may be defective.

ENGINE POWERED MACHINES ONLY

Functions Disabled (Engine Powered Machines Only): Engine Throttle Hold

Step	Pretest Instructions	Test	Result	Corrective Action
2.158.1	Run system test	Do other functions fail system test?	Yes No	Check: 4.1.15, 4.1.1, otherwise go to step 2.158.2 Go to step 2.158.2
2.158.2	Disconnect solenoid at X097. On harness end, short X097 WHT/YEL 48-3 to X097 BLACK wire	Rerun System Test	Analyzer Message "THROTTLE HOLD SOLENOID SHORT TO GROUND" Analyzer Message "THROTTLE HOLD SOLENOID OPEN CIRCUIT"	Replace solenoid and/or connector Go to step 2.158.3
2.158.3	Replace X003.11 with a jumper to X003.3	Rerun System Test	Analyzer Message "THROTTLE HOLD SOLENOID SHORT TO GROUND" Analyzer Message "THROTTLE HOLD SOLENOID OPEN CIRCUIT"	Wire WHT/YEL 48-3 broken. Repair or replace Possible Cause: 4.1.10

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