

- |           |              |                 |                 |
|-----------|--------------|-----------------|-----------------|
| 1. Barrel | 5. Wear Ring | 9. Wiper Seal   | 13. Backup Ring |
| 2. Rod    | 6. T-seal    | 10. O-Ring      | 14. O-Ring      |
| 3. Head   | 7. O-Ring    | 11. Piston Seal |                 |
| 4. Spacer | 8. Retainer  | 12. Wear Ring   |                 |

Figure 5-48. Steer Cylinder

## SECTION 5 - BASIC HYDRAULIC INFORMATION & SCHEMATICS

- Using suitable protection, clamp the cylinder rod in a vise or similar holding fixture as close to the piston as possible.
- Remove the rod from the holding fixture. Remove the cylinder head from the barrel.

### NOTICE

REMOVE SEALS USING A BRASS OR PLASTIC PICK ONLY. DO NOT USE A KNIFE, SHARP OBJECT, OR SCREW DRIVER. MAKE NOTE OF SEAL ORIENTATION BEFORE REMOVING FOR PROPER INSTALLATION.

- Remove and discard the o-rings and backup ring from the outer groove of the cylinder.
- Remove and discard the o-rings, retainer, wiper seal, rod seal and wear ring from the applicable inner groove of the cylinder heads.
- Remove spacer from the cylinder rod.

**NOTE:** Repeat steps 8 thru 11 to remove cylinder head assembly from the other end of cylinder rod.

- Screw the piston counterclockwise, by hand and remove the piston from cylinder rod.
- Remove and discard wear ring and piston seal from the piston.

### CLEANING AND INSPECTION

- Clean all parts thoroughly in an approved cleaning solvent.
- Inspect the cylinder rod for scoring, tapering, ovality, or other damage. If necessary, dress rod with Scotch Brite or equivalent. Replace rod if necessary.
- Inspect inner surface of cylinder barrel tube for scoring or other damage. Check inside diameter for tapering or ovality. Replace if necessary.
- Inspect threaded portion of barrel for damage. Dress threads as necessary. Inspect piston surface for damage and scoring and for distortion. Dress piston surface or replace piston as necessary.
- Inspect threaded portion of piston for damage. Dress threads as necessary.
- Inspect seal and o-ring grooves in piston and head for burrs and sharp edges. Dress applicable surfaces as necessary.
- Inspect cylinder head inside diameter for scoring or other damage and for ovality and tapering. Replace as necessary.
- Inspect threaded portion of head for damage. Dress threads as necessary.
- Inspect cylinder head outside diameter for scoring or other damage and ovality and tapering. Replace as necessary.

### ASSEMBLY

**NOTE:** Prior to cylinder assembly, ensure that the proper cylinder seal kit is used. See your JLG Parts Manual.

**NOTE:** Apply a light film of hydraulic oil to all components prior to assembly.

### NOTICE

WHEN INSTALLING NEW SEALS, ENSURE SEALS ARE INSTALLED PROPERLY. IMPROPER SEAL INSTALLATION COULD RESULT IN CYLINDER LEAKAGE AND IMPROPER CYLINDER OPERATION.

- Using suitable protection, clamp the cylinder rod in a vise or similar holding fixture close to piston as possible.
- Carefully thread the piston on the cylinder rod hand tight.
- Place new piston seal and wear rings in outer groove of the piston. (A tube, with I.D. slightly larger than the O.D. of the piston is recommended to install the solid seal).

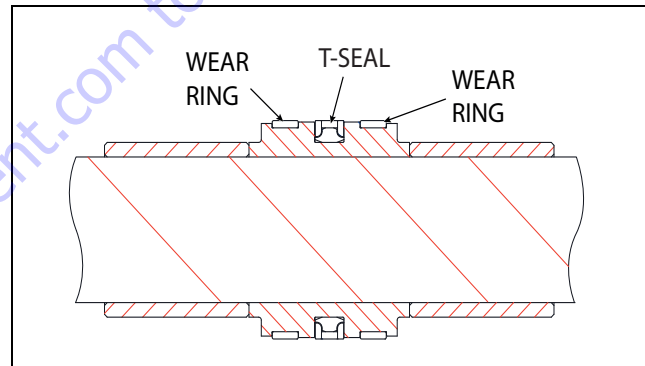


Figure 5-49. Installation of Piston Seal Kit

- A special tool is used to install a new rod seal into the applicable cylinder head gland groove.

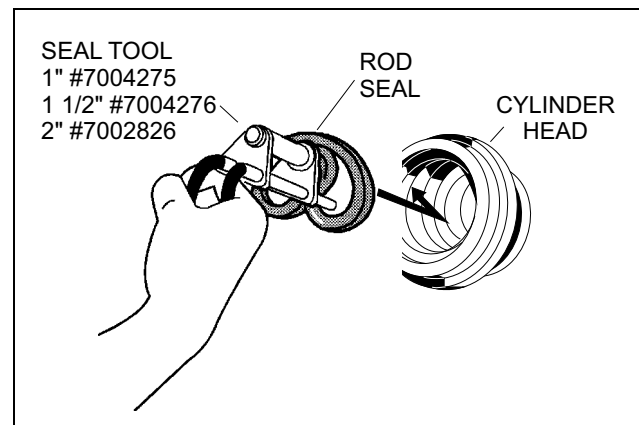


Figure 5-50. Rod Seal Installation



5. Use a soft mallet to tap a new wiper seal into the applicable cylinder guide gland groove. Install the new retaining ring into the applicable groove of the cylinder Head.

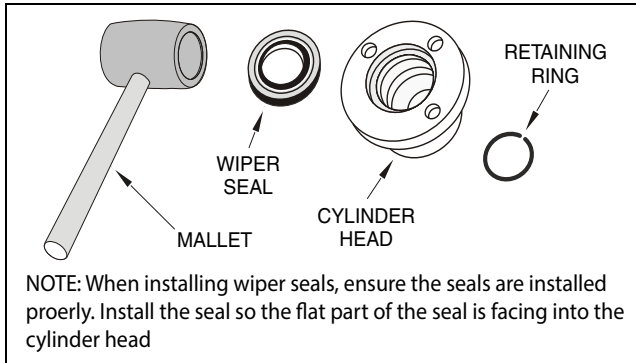


Figure 5-51. Wiper Seal Installation

6. Place a new o-ring and wear ring in the applicable inner groove of the cylinder head.
7. Place a new o-rings and backup ring in the applicable outer groove of the cylinder head.

**NOTE:** Repeat steps 4 thru 7 to install cylinder head assembly into the other end of barrel.

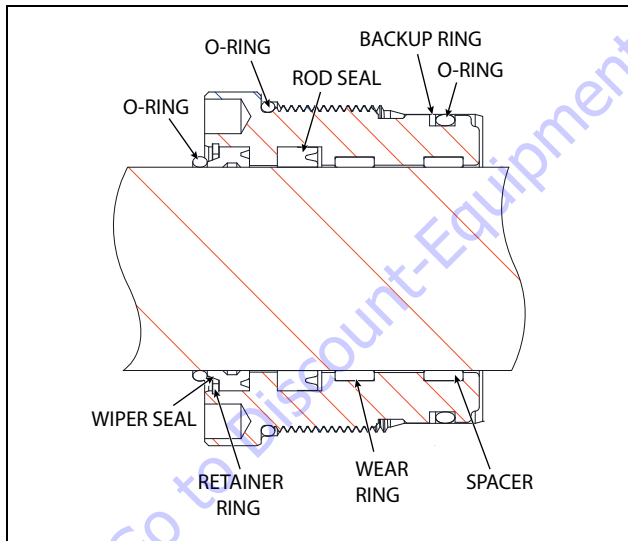


Figure 5-52. Cylinder Head Seal Installation

8. Remove the cylinder rod from the holding fixture.

**NOTICE**

**EXTREME CARE SHOULD BE TAKEN WHEN INSTALLING THE CYLINDER ROD, HEAD, AND PISTON. AVOID PULLING THE ROD OFF-CENTER, WHICH COULD CAUSE DAMAGE TO THE PISTON AND CYLINDER BARREL SURFACES.**

9. Clamp barrel securely and support rod. Insert piston end into barrel cylinder. Do not damage or dislodge piston wear ring and seal.
10. Install Cylinder head assembly onto both ends of cylinder rod.
11. Screw cylinder head into the barrel from both end. Torque to 590 ft.lbs. (800 Nm).
12. Install plug into the cylinder port and torque to 22 ft.lbs (30 Nm).

## Telescope Cylinder

### DISASSEMBLY

#### NOTICE

DISASSEMBLY OF THE CYLINDER SHOULD BE PERFORMED ON A CLEAN WORK SURFACE IN A DIRT FREE WORK AREA.

1. Connect a suitable auxiliary hydraulic power source to the cylinder port block fitting.

#### WARNING

DO NOT FULLY EXTEND CYLINDER TO THE END OF STROKE. RETRACT CYLINDER SLIGHTLY TO AVOID TRAPPING PRESSURE.

2. Operate the hydraulic power source and extend the cylinder. Shut down and disconnect the power source. Adequately support the cylinder rod, if applicable.
3. Place the cylinder barrel into a suitable holding fixture. Tap around outside of cylinder head retainer with a suitable hammer to break thread-locking compound.

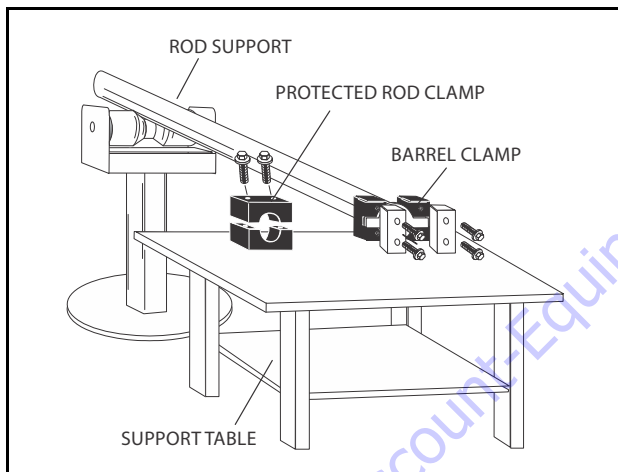


Figure 5-53. Cylinder Barrel Support

4. Remove bolts and valve assembly from the barrel end. Discard o-rings.

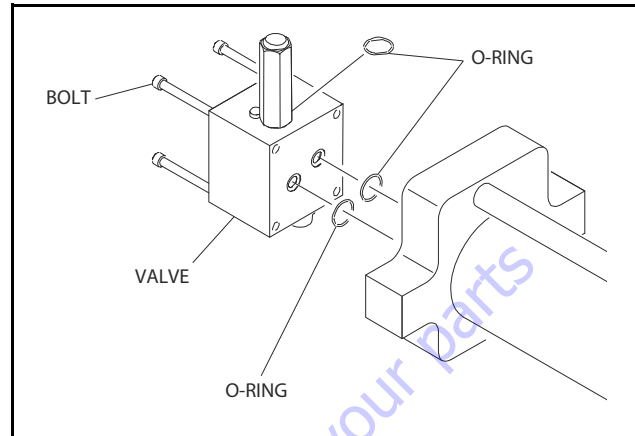


Figure 5-54. Valve Removal

5. Mark cylinder head and barrel with a center punch for easy realignment. Using an allen wrench, loosen the cylinder head retainer capscrews, and remove capscrews from cylinder barrel.

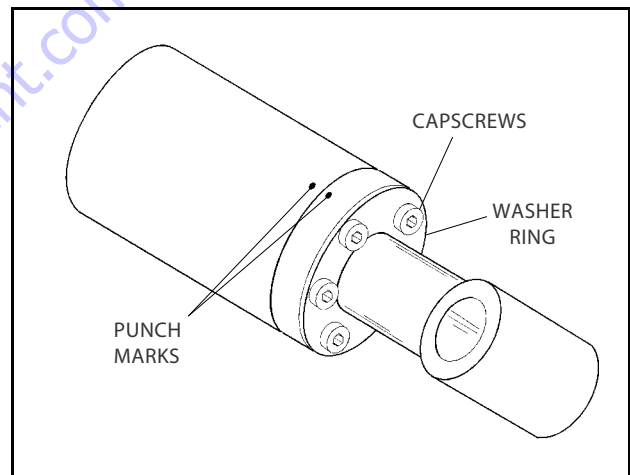
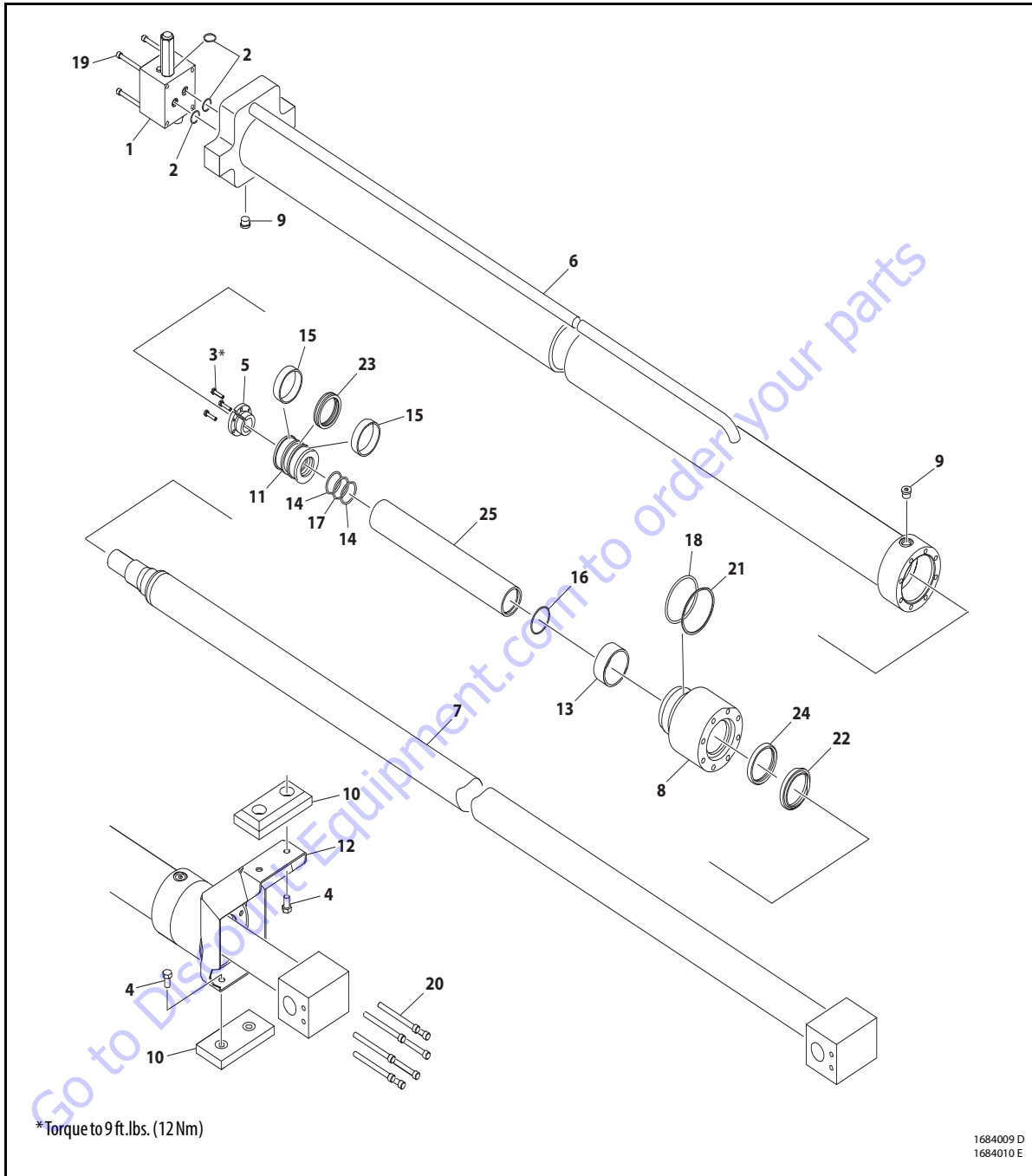


Figure 5-55. Cylinder Head Removal

6. Attach a suitable pulling device to the cylinder rod end.

#### NOTICE

EXTREME CARE SHOULD BE TAKEN WHEN REMOVING THE CYLINDER ROD, HEAD, AND PISTON. AVOID PULLING THE ROD OFF-CENTER, WHICH COULD CAUSE DAMAGE TO THE PISTON AND CYLINDER BARREL SURFACES.



- |                    |                 |                   |              |                 |
|--------------------|-----------------|-------------------|--------------|-----------------|
| 1. Valve Assembly  | 6. Barrel       | 11. Piston        | 16. O-ring   | 21. Backup Ring |
| 2. Valve Seal      | 7. Rod          | 12. Support Plate | 17. O-ring   | 22. Wiper Seal  |
| 3. Bolt            | 8. Head         | 13. Wear Ring     | 18. O-ring   | 23. Piston Seal |
| 4. Bolt            | 9. Plug         | 14. Backup Ring   | 19. Capscrew | 24. Rod Seal    |
| 5. Tapered Bushing | 10. Pad Support | 15. Wear Ring     | 20. Bolt     | 25. Spacer      |

Figure 5-56. Telescope Cylinder

7. With the barrel clamped securely, carefully withdraw the complete rod assembly from the cylinder barrel.

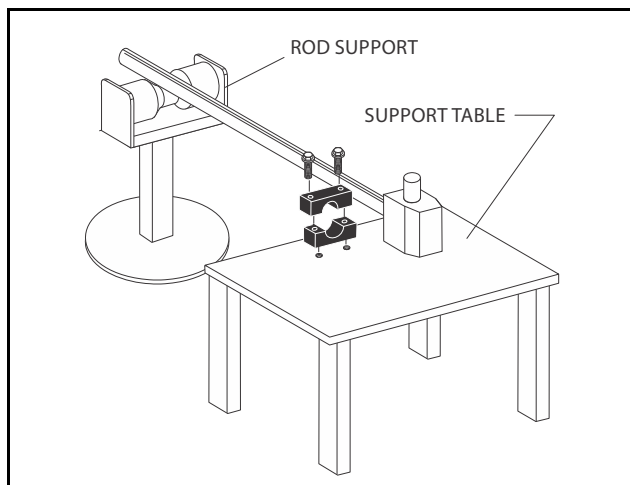


Figure 5-57. Cylinder Rod Support

8. Using suitable protection, clamp the cylinder rod in a vise or similar holding fixture as close to the piston as possible.
9. Loosen and remove bolt from tapered bushing and piston.
10. Insert bolts in threaded holes in outer piece of tapered bushing. Progressively tighten bolts until bushing is loose. Remove tapered bushing from piston.

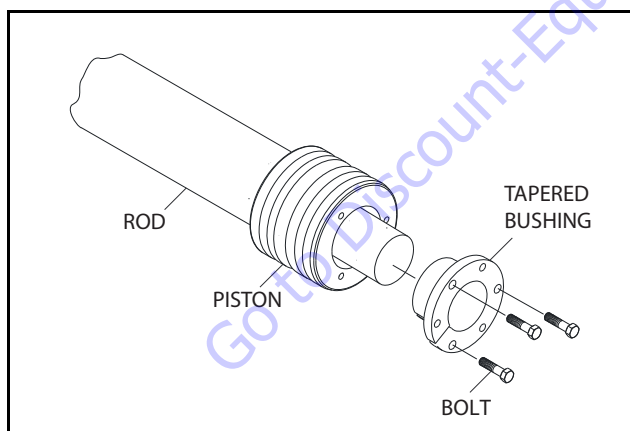


Figure 5-58. Tapered Bushing Removal

11. Screw the piston counterclockwise by hand and remove the piston from cylinder rod.

**NOTICE**

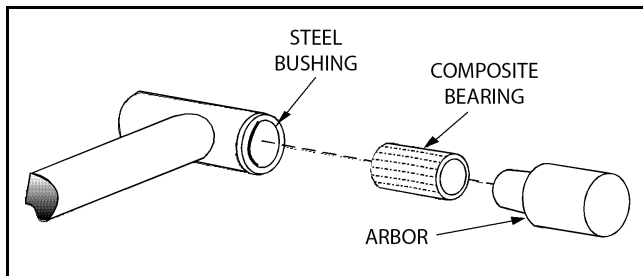
REMOVE SEALS USING A BRASS OR PLASTIC PICK ONLY. DO NOT USE A KNIFE, SHARP OBJECT, OR SCREW DRIVER. MAKE NOTE OF SEAL ORIENTATION BEFORE REMOVING FOR PROPER INSTALLATION.

12. Remove and discard backup ring and o-ring from the inside groove of piston. Remove and discard wear ring and piston seal from the outside groove of the piston.
13. Remove spacer from the cylinder rod.
14. Remove and discard the o-ring, backup ring from outer groove of the cylinder head. Remove and discard the wear ring, o-ring, wiper seal and rod seal inner groove of the cylinder head.
15. Remove the rod from the holding fixture. Remove the cylinder head.

**CLEANING AND INSPECTION**

1. Clean all parts thoroughly in an approved cleaning solvent.
2. Inspect the cylinder rod for scoring, tapering, ovality, or other damage. If necessary, dress rod with Scotch Brite or equivalent. Replace rod if necessary.
3. Inspect threaded portion of rod for excessive damage. Dress threads as necessary.
4. Inspect inner surface of cylinder barrel tube for scoring or other damage. Check inside diameter for tapering or ovality. Replace if necessary.
5. Inspect piston surface for damage and scoring and for distortion. Dress piston surface or replace piston as necessary.
6. Inspect threaded portion of piston for damage. Dress threads as necessary.
7. Inspect seal and o-ring grooves in piston for burrs and sharp edges. Dress applicable surfaces as necessary.
8. Inspect cylinder head inside diameter for scoring or other damage and for ovality and tapering. Replace as necessary.
9. Inspect seal and o-ring grooves in head for burrs and sharp edges. Dress applicable surfaces as necessary.
10. Inspect cylinder head outside diameter for scoring or other damage and ovality and tapering. Replace as necessary.
11. If applicable, inspect rod and barrel bearings for signs of correct excessive wear or damage. Replace as necessary.
  - a. Thoroughly clean hole, (steel bushing) of burrs, dirt etc. to facilitate bearing installation.
  - b. Inspect steel bushing for wear or other damage. If steel bushing is worn or damaged, rod/barrel must be replaced.
  - c. Lubricate inside of steel bushing prior to bearing installation.
  - d. Using an arbor of the correct size, carefully press the bearing into steel bushing.
12. Inspect wear pads for damage and worn pads. Replace parts as required.

**NOTE:** Install pin into the composite bearing dry. Lubrication is not required with nickel plated pins and bearings.



**Figure 5-59. Composite Bearing Installation**

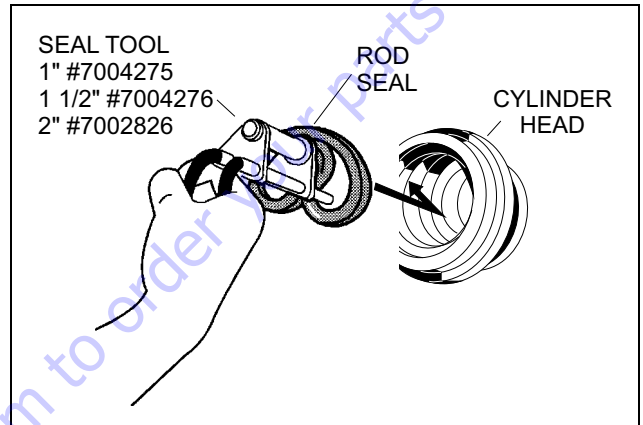
13. Inspect spacer for burrs and sharp edges. If necessary, dress inside diameter surface with Scotch Brite or equivalent.
14. Inspect port block fittings and holding valve. Replace as necessary.
15. Inspect the oil ports for blockage or the presence of dirt or other foreign material. Repair as necessary.
16. Inspect piston rings for cracks or other damage. Replace as necessary.

**ASSEMBLY**

**NOTE:** Prior to cylinder assembly, ensure that the proper cylinder seal kit is used. See your JLG Parts Manual.

**NOTE:** Apply a light film of hydraulic oil to all components prior to assembly.

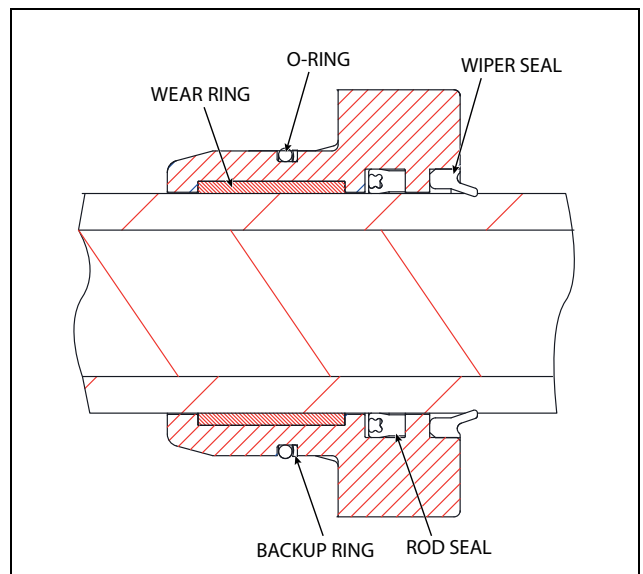
1. A special tool is used to install a new rod seal into the applicable cylinder head gland groove.



**Figure 5-60. Rod Seal Installation**

**NOTICE**

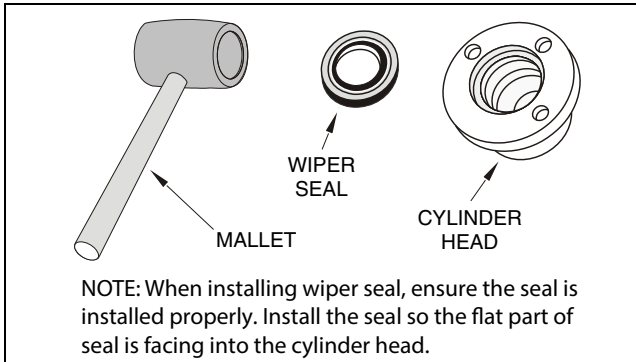
**WHEN INSTALLING NEW SEALS, ENSURE SEALS ARE INSTALLED PROPERLY. IMPROPER SEAL INSTALLATION COULD RESULT IN CYLINDER LEAKAGE AND IMPROPER CYLINDER OPERATION.**



**Figure 5-61. Cylinder Head Seal Installation**

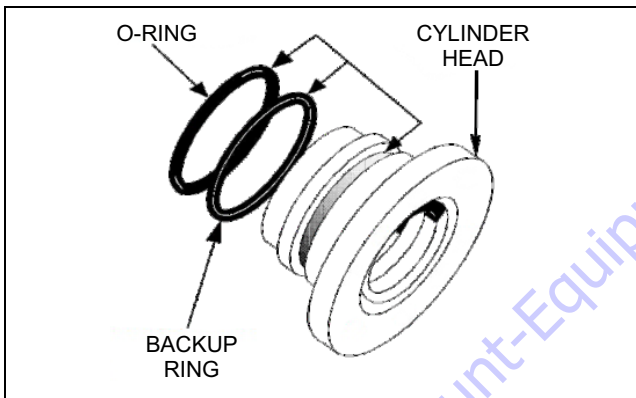
## SECTION 5 - BASIC HYDRAULIC INFORMATION & SCHEMATICS

- Use a soft mallet to tap a new wiper seal into the applicable cylinder head gland groove.



**Figure 5-62. Wiper Seal Installation**

- Place a new o-ring and backup ring in the applicable outside groove of the cylinder head.
- Place a new wear ring in the applicable inside groove of cylinder head.

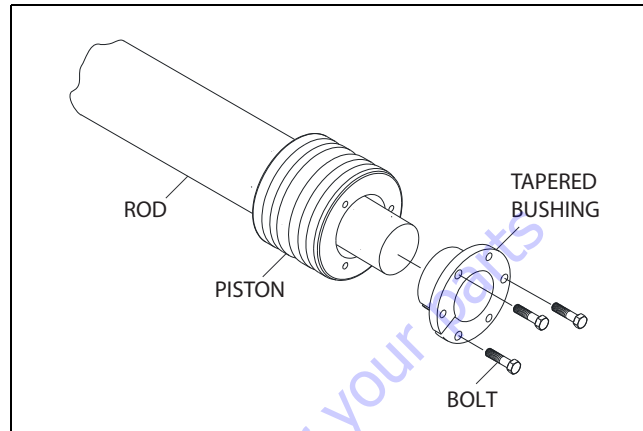


**Figure 5-63. Installation of Head Seal Kit**

- Place the cylinder cap over the rod and carefully install the head on the rod, ensuring that the wiper seal and rod seals are not damaged or dislodged. Push the head along the rod to the rod end.
- Push spacer onto the cylinder rod.
- Place a new o-ring and backup ring in the inner groove of the piston.
- Using suitable protection, clamp the cylinder rod in a vise or similar holding fixture as close to piston as possible.
- Thread the piston on the cylinder rod hand tight, ensuring that the o-ring are not damaged or dislodged.

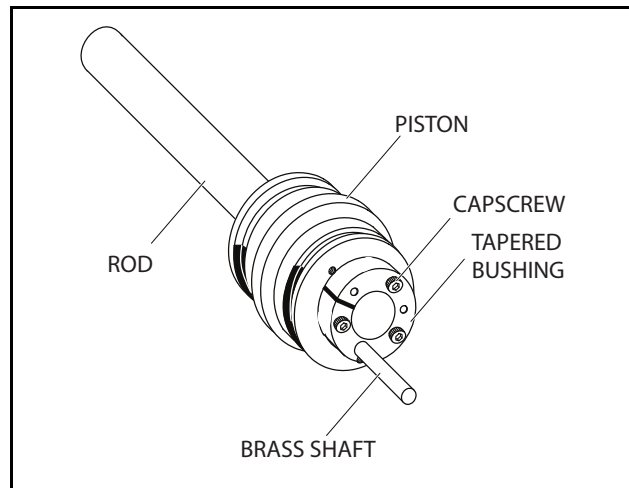
**NOTE:** When installing the tapered bushing, piston and mating end of rod must be free of oil.

- Assemble the tapered bushing loosely into the piston and insert capscrews through the drilled holes in the bushing and into the tapped holes in the piston.



**Figure 5-64. Tapered Bushing Removal**

- Tighten the bolt evenly and progressively in rotation to 9 ft.lbs. (12 Nm).
- After the screws have been torqued, tap the tapered bushing with a hammer (16 to 24 oz.) and brass shaft (approximately 3/4" in diameter) as follows;
  - Place the shaft against the cylinder rod and in contact with the bushing in the spaces between the capscrews.
  - Tap each space once; this means the tapered bushing is tapped 3 times as there are 3 spaces between the capscrews.



**Figure 5-65. Seating the Tapered Bushing**

- Rotate the bolt evenly and progressively in rotation to 9 ft.lbs. (12 Nm).
- Remove the cylinder rod from the holding fixture.

15. Place new cap seal and wear rings in the outer piston diameter groove. (A tube, with I.D. slightly larger than the O.D. of the piston is recommended to install the solid seal).

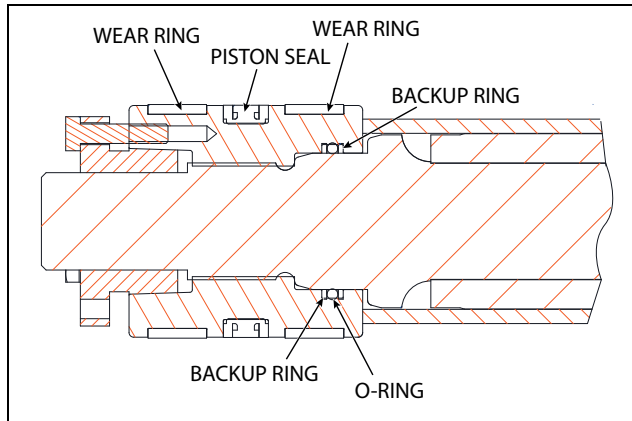


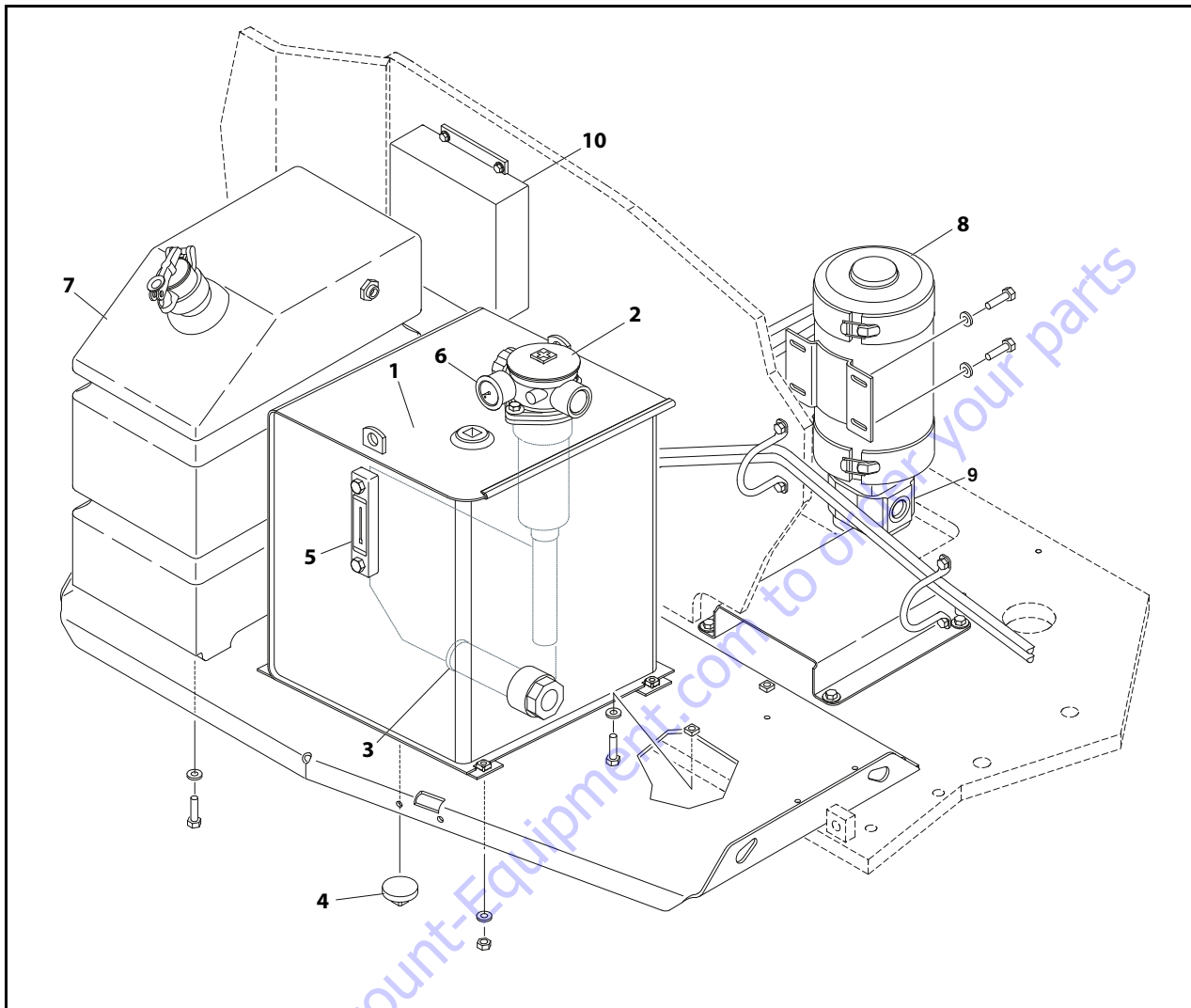
Figure 5-66. Piston Seal Kit Installation

16. Position the cylinder barrel in a suitable holding fixture.

### NOTICE

**EXTREME CARE SHOULD BE TAKEN WHEN INSTALLING THE CYLINDER ROD, HEAD, AND PISTON. AVOID PULLING THE ROD OFF-CENTER, WHICH COULD CAUSE DAMAGE TO THE PISTON AND CYLINDER BARREL SURFACES.**

17. With barrel clamped securely, and while adequately supporting the rod, insert the piston end into the barrel cylinder. Ensure that the piston loading o-ring and seal ring are not damaged or dislodged.
18. Continue pushing the rod into the barrel until the cylinder head gland can be inserted into the barrel cylinder.
19. Secure the cylinder head and cylinder cap in the cylinder barrel.
20. After the cylinder has been reassembled, the rod should be pushed all the way in (fully retracted) prior to the reinstallation of any holding valve or valves.
21. Install valve assembly, new o-ring and plugs on the cylinder barrel.



- |                             |                              |
|-----------------------------|------------------------------|
| 1. Hydraulic Tank           | 6. Filter Indicator          |
| 2. Filter & Pressure Switch | 7. Fuel Tank (M Models Only) |
| 3. Suction Strainer         | 8. Electric Motor            |
| 4. Magnetic Plug            | 9. Hydraulic Pump            |
| 5. Sight Gauge              | 10. Contactor Module         |

Figure 5-67. Hydraulic Tank and Pump



## 5.4 PRESSURE SETTING

Proportional Main Relief - 3200 psi (220 Bar)

Lift Down - 1100 psi (76 Bar)

Lift Up - 2500 (172 Bar)

Swing - 2500 psi (172 Bar)

Flow Control / Bang Bang Main Relief - 3000 psi (207 Bar)

Steer - 1800 (124 Bar)

Platform Level Up - 2750 psi (189.60 Bar)

Platform Level Down - 1750 psi (120.65 Bar)

Jib Relief - 2550 psi (175.8 Bar)

**NOTE:** All functions must be activated from the platform control station when adjusting pressures at the Platform Control and Main Valve Blocks.

### Proportional Main Relief

1. Connect the pressure gauge at the MP port on the main valve and disconnect the lift up coil on the main valve block.
2. Activate the lift up switch from the platform. Adjust pressure to 3200 psi (220 Bar).

### Lift Down

1. Connect the pressure gauge at the MP port on the main valve.
2. Activate and bottom out lift down. Adjust pressure to 1100 psi (76 Bar).

### Lift Up

1. Connect the pressure gauge at the MP port on the main valve.
2. Activate lift up until end of lift cylinder stroke. Adjust pressure to 2500 psi (172 Bar). If ceiling height will not allow elevation, disconnect lift up hose (port #8 on valve bank) and cap the port to make the setting.

### Swing

1. Connect the pressure gauge at the MP port on the main valve.
2. Activate the swing function with the turntable lock pin engaged. Adjust pressure to 2500 psi (172 Bar).

### Flow Control / Bang Bang Main Relief

1. Connect the pressure gauge at the MP port on the main valve.
2. Activate and bottom out telescope in. Adjust pressure to 3000 psi (207 Bar).

### Steer

1. Connect the pressure gauge at the MP port on the main valve.
2. Activate and bottom out steer right or left. Adjust pressure to 1800 psi (124 Bar).

### Platform Level Down

1. Connect a pressure gauge to the M1 port on the platform control valve bank.
2. Activate and bottom out Platform Level Down. Adjust to 1750 psi (120.65 Bar).

### Platform Level Up Relief

1. Connect a pressure gauge to the M1 port on the platform control valve bank.
2. Activate and bottom out Platform Level Up. Adjust to 2750 psi (189.60 Bar).

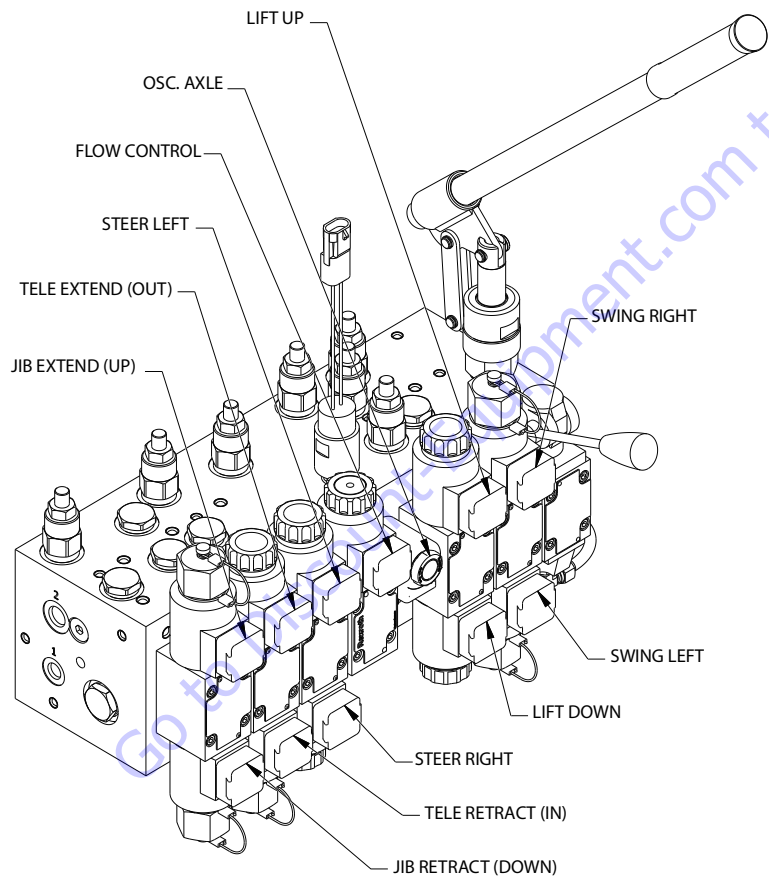
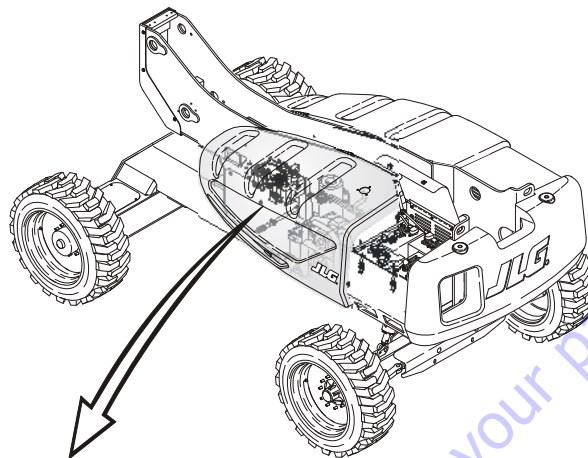
### Jib Relief

1. Connect a pressure gauge at the M1 port on the platform control valve bank.
2. Activate and bottom out either Jib Up or Down. Adjust the relief to 2550 psi (175.8 Bar).

**SECTION 5 - BASIC HYDRAULIC INFORMATION & SCHEMATICS**

NOTE: WHEN CHECKING MAIN RELIEF PRESSURE UNPLUG LIFT UP COIL.

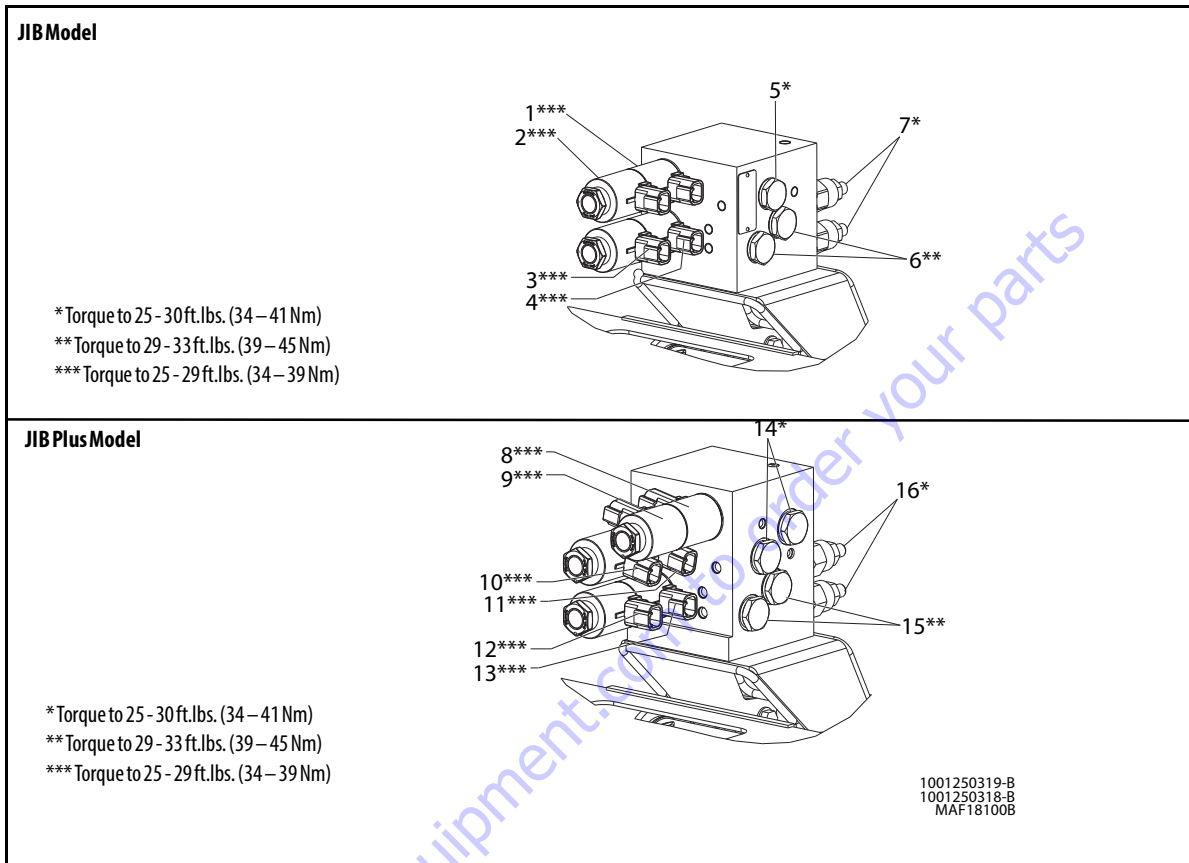
NOTE: NEED TO HAVE 3000 PSI ON FLOW CONTROL RELIEF IN ORDER TO GET CORRECT ROTATE PRESSURE. BOTTOM OUT TELESCOPE FUNCTION.



**NOTE:** Torque all cartridges to 25 - 30 ft.lbs. (34 - 41 Nm)

1001219391-B  
MAF18090B

**Figure 5-68. Main Control Valve - Hydraulic**



- |                               |                  |                                |                          |
|-------------------------------|------------------|--------------------------------|--------------------------|
| 1. Rotate Right               | 7. Relief valve  | 13. Level Up                   | 19. Level Up             |
| 2. Rotate Left                | 8. JIB Right     | 14. Flow Control Valve         | 20. Level Down           |
| 3. Level Down                 | 9. JIB Left      | 15. Pilot operated check valve | 21. Rotate Regulator     |
| 4. Level Up                   | 10. Rotate Right | 16. Relief valve               | 22. Level Backward       |
| 5. Flow Control Valve         | 11. Rotate Left  | 17. Rotate Right               | 23. Level Forward        |
| 6. Pilot operated check valve | 12. Level Down   | 18. Rotate Left                | 24. Platform Level Check |

**Figure 5-69. Platform Control valve Assembly**

# SECTION 5 - BASIC HYDRAULIC INFORMATION & SCHEMATICS

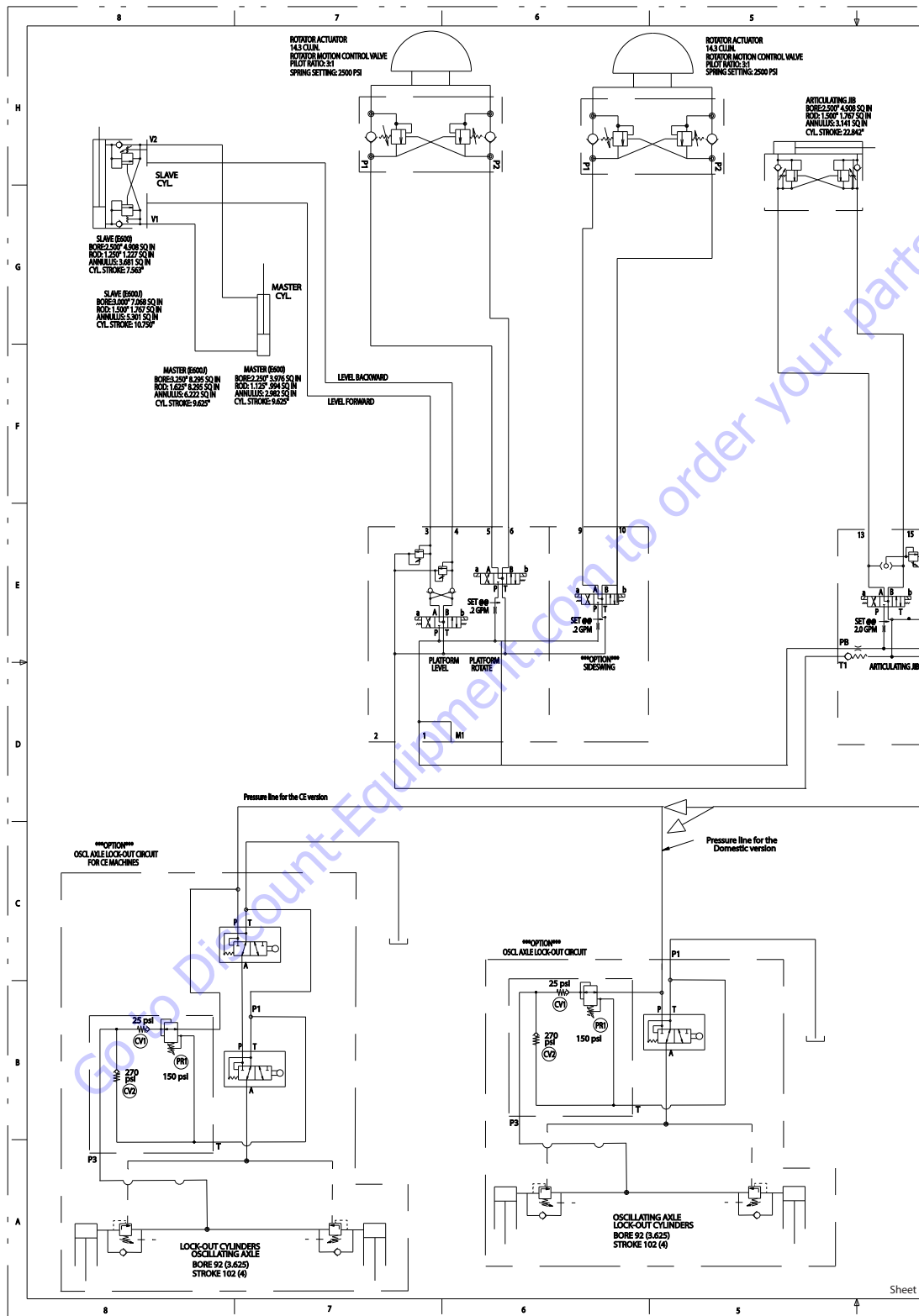


Figure 5-70. Hydraulic Schematics - Sheet 1 of 2

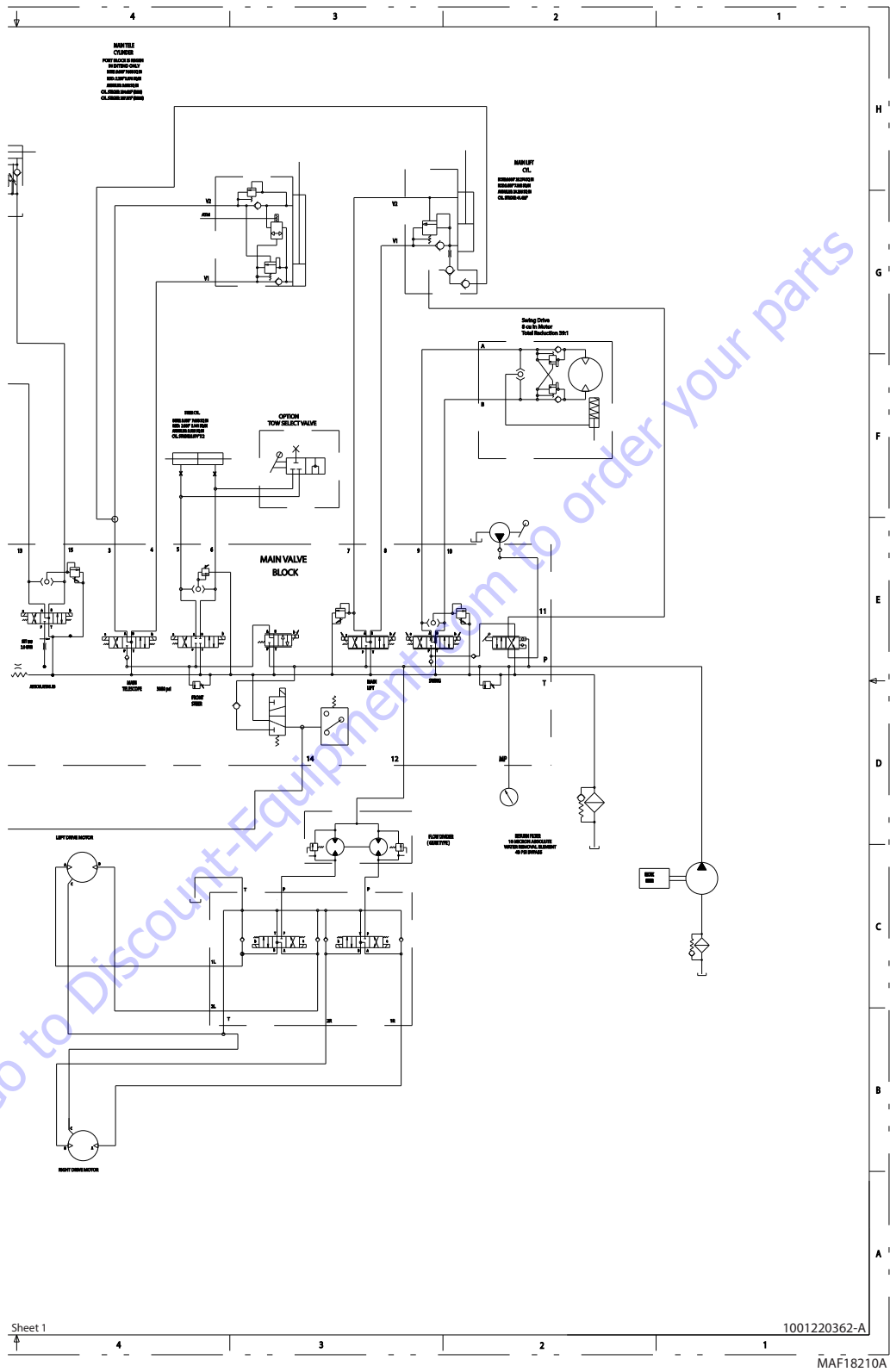


Figure 5-71. Hydraulic Schematics - Sheet 2 of 2

# PARTS FINDER

**Search Website  
by Part Number**



**Search Manual  
Library For Parts  
Manual & Lookup Part  
Numbers – Purchase  
or Request Quote**

A screenshot of the "Search Manuals" form. The form has a title "Search Manuals" and a subtitle "Please provide information to help us locate the manual and/or parts you need." It includes fields for "Brand", "Model", "Serial", "Part Number", and "Quantity". There is a "Search" button at the bottom.

**Can't Find Part or  
Manual? Request Help  
by Manufacturer,  
Model & Description**

A screenshot of the "Parts Order Form". The form has a title "Parts Order Form" and a subtitle "Please fill in as much information as possible." It includes fields for "Manufacturer", "Model", "Description", "Part Number", "Quantity", and "Comments". There is a "Submit" button at the bottom.

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We sell worldwide for the brands: Genie, Terex, JLG, MultiQuip, Mikasa, Essick, Whiteman, Mayco, Toro Stone, Diamond Products, Generac Magnum, Airman, Haulotte, Barreto, Power Blanket, Nifty Lift, Atlas Copco, Chicago Pneumatic, Allmand, Miller Curber, Skyjack, Lull, Skytrak, Tsurumi, Husquvarna Target, , Stow, Wacker, Sakai, Mi-T- M, Sullair, Basic, Dynapac, MBW, Weber, Bartell, Bennar Newman, Haulotte, Ditch Runner, Menegotti, Morrison, Contec, Buddy, Crown, Edco, Wyco, Bomag, Laymor, Barreto, EZ Trench, Bil-Jax, F.S. Curtis, Gehl Pavers, Heli, Honda, ICS/PowerGrit, IHI, Partner, Imer, Clipper, MMD, Koshin, Rice, CH&E, General Equipment, ,AMida, Coleman, NAC, Gradall, Square Shooter, Kent, Stanley, Tamco, Toku, Hatz, Kohler, Robin, Wisconsin, Northrock, Oztec, Toker TK, Rol-Air, Small Line, Wanco, Yanmar

## SECTION 6. JLG CONTROL SYSTEM

## 6.1 INTRODUCTION

**NOTICE**

WHEN INSTALLING A NEW POWER MODULE CONTROLLER ON THE MACHINE, IT WILL BE NECESSARY TO PROGRAM THE CONTROLLER FOR THE PROPER MACHINE CONFIGURATION, INCLUDING OPTIONS.

**NOTICE**

IT IS A GOOD PRACTICE TO AVOID PRESSURE-WASHING ELECTRICAL/ELECTRONIC COMPONENTS. SHOULD PRESSURE-WASHING BE UTILIZED TO WASH AREAS CONTAINING ELECTRICAL/ELECTRONIC COMPONENTS, JLG INDUSTRIES, INC. RECOMMENDS A MAXIMUM PRESSURE OF 750 PSI (52 BAR) AT A MINIMUM DISTANCE OF 12 INCHES (30.5 CM) AWAY FROM THESE COMPONENTS. IF ELECTRICAL/ELECTRONIC COMPONENTS ARE SPRAYED, SPRAYING MUST NOT BE DIRECT AND BE FOR BRIEF TIME PERIODS TO AVOID HEAVY SATURATION.

The JLG designed Control System is a 48 volt based motor control unit installed on the boom lift.

The JLG Control System has reduced the need for exposed terminal strips, diodes and trimpots and provides simplicity in viewing and adjusting the various personality settings for

smooth control of: acceleration, deceleration, creep and max.-speed for all boom, drive, and steering functions.

The motor controller will control current output, as programmed for smooth operation and maximum cycle time. Ground control speeds for all boom functions can also be programmed into the motor controller. The motor controller also features an adjustable time limit for positive traction.

The JLG Control System controller has a built in LED to indicate any faults. The system stores recent faults which may be accessed for troubleshooting. Optional equipment includes an hour meter, beacon light, function cutout, and ground alarm. These options may be added later but must be programmed into the motor controller when installed.

The Control System may be accessed in one of two ways: Utilizing a custom designed, hand held analyzer (Analyzer Kit, JLG part no. 2901443) which will display two lines of information at a time, by scrolling through the program.

**NOTE:** Each module has a label with the JLG part number and a serial number which contains a date code.

The following instructions are for using the hand held analyzer.

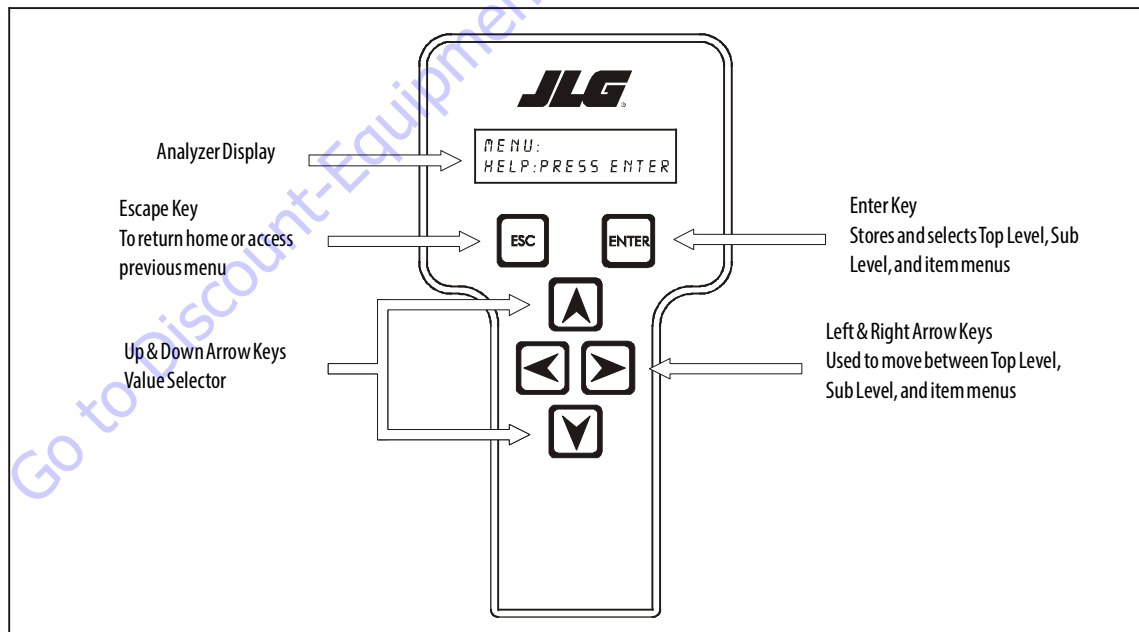


Figure 6-1. Hand Held Analyzer

## 6.2 TO CONNECT THE JLG CONTROL SYSTEM ANALYZER

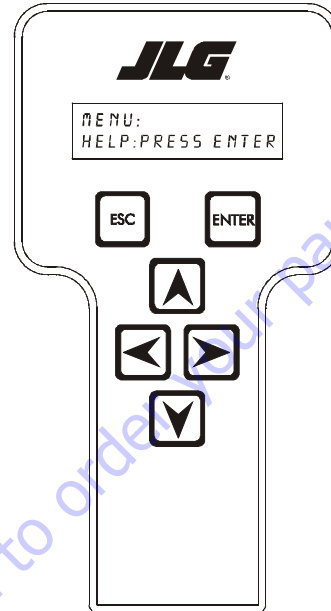
1. Connect the four pin end of the cable supplied with the analyzer, to the motor controller module located in the platform box or at the power module and connect the remaining end of the cable to the analyzer.

**NOTE:** The cable has a four pin connector at each end of the cable; the cable cannot be connected backwards.

2. Power up the Control System by turning the lower key to the platform or ground position and pulling both emergency stop buttons on.


## Using the Analyzer

With the machine power on and the analyzer connected properly, the analyzer will display the following:



**HELP:  
PRESS ENTER**

At this point, using the **RIGHT**  and **LEFT**  arrow keys, you can move between the top level menu items. To


select a displayed menu item, press **ENTER** . To cancel a


selected menu item, press **ESC**  then you will be able to scroll using the right and left arrow keys to select a different menu item.

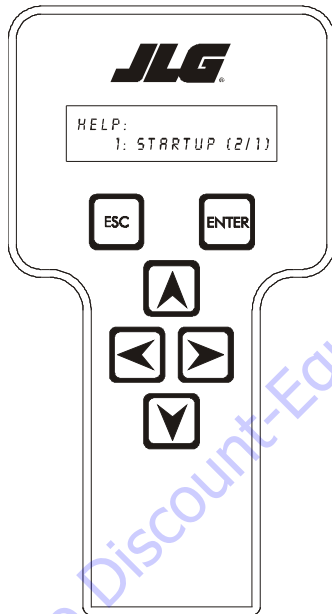


The top level menus are as follows:

- HELP
- DIAGNOSTICS
- SYSTEM TEST
- ACCESS LEVEL
- PERSONALITIES
- MACHINE SETUP
- CALIBRATIONS (view only)

If you press **ENTER** , at the **HELP: PRESS ENTER** display, and a fault is present, the analyzer display will scroll the fault across the screen. If there was no fault detected, the display will read: **HELP: EVERYTHING OK**. If powered up at the ground station, the display will read: **GROUND OK**.

If **ENTER**  is pressed again, the display moves to the following display:




**LOGGED HELP**  
**1: STARTUP (2/1)**


At this point, the analyzer will display the last fault the system has seen, if any are present. You may scroll through the fault logs to view what the last 25 faults were. Use the right and left arrow keys to scroll through the fault logs. To return to the

beginning, press **ESCAPE**  two times. **STARTUP (2/1)** indicates a power up.

When a top level menu is selected, a new set of menu items may be offered: for example:

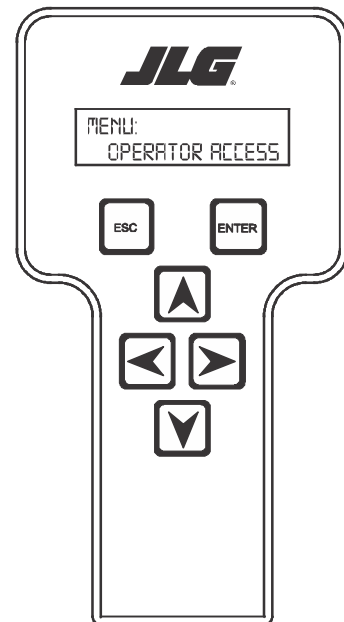
- DRIVE
- BOOM
- SYSTEM
- DATALOG
- VERSIONS

Pressing **ENTER**  with any of the above displayed menus, will display additional sub-menus within the selected menu. In some cases, such as **DRIVE**, the next level is the parameter or information to be changed. Refer to the flow chart for what menus are available within the top level menus. You may only view the personality settings for selected menu while in access level 2. Remember, you may always cancel a selected


menu item by pressing the **ESCAPE**  key.

### Changing the Access Level of the Hand Held Analyzer

When the analyzer is first connected, you will be in access level 2 which enables you to only view most settings which cannot be changed until you enter a password to advance to a lower level. This ensures that a setting cannot be accidentally altered. To change the access level, the correct password must be entered. To enter the password, scroll to the **ACCESS LEVEL** menu. For example:




**MENU:**  
**OPERATOR ACCESS**

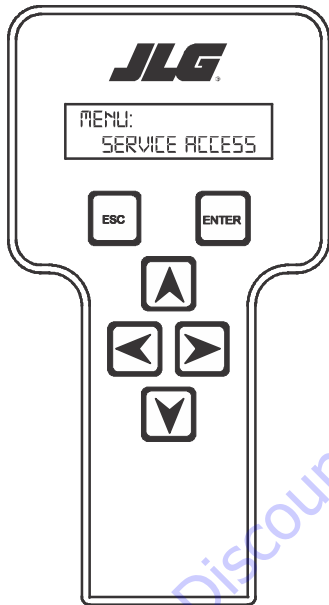
Press **ENTER**  to select the **ACCESS LEVEL** menu.

Using the **UP**  or **DOWN**  arrow keys, enter the first digit of the password, 3.

Then using the **RIGHT**  arrow key, position the cursor to the right one space to enter the second digit of the password.

Use the **UP**  or **DOWN**  arrow key to enter the second digit of the password which is 33271.

Once the correct password is displayed, press **ENTER** . The access level should display the following, if the password was entered correctly:



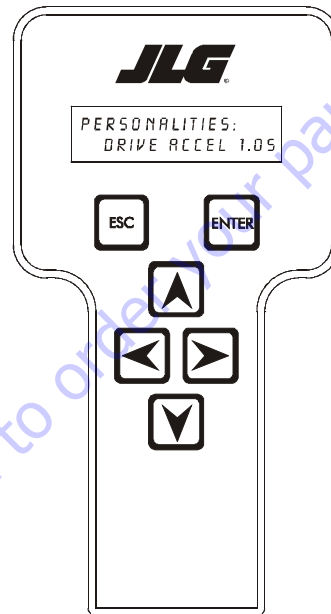
**MENU:  
SERVICE ACCESS**

Repeat the above steps if the correct access level is not displayed or you can not adjust the personality settings.

## Adjusting Parameters Using the Hand Held Analyzer


Once you have gained access to level 1, and a personality item


is selected, press the **UP**  or **DOWN**  arrow keys to adjust its value, for example:





**PERSONALITIES:  
DRIVE ACCEL 1.05**

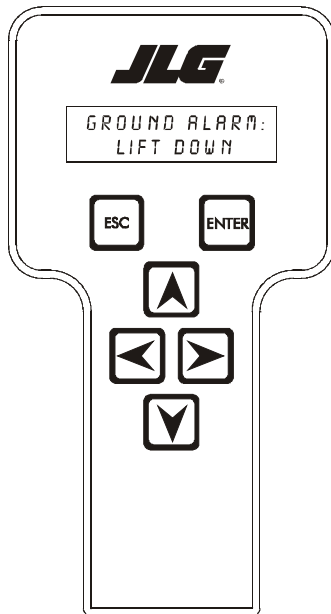
There will be a minimum and maximum for the value to ensure efficient operation. The Value will not increase if the **UP**

 arrow is pressed when at the maximum value nor will

the value decrease if the **DOWN**  arrow is pressed and the value is at the minimum value for any particular personality. If the value does not change when pressing the up and down arrows, check the access level to ensure you are at Service Access.

## Machine Setup

When a machine digit item is selected, press the **UP**  or **DOWN**  arrow keys to adjust its value, for example:



### GROUND ALARM: LIFT DOWN

The effect of the machine digit value is displayed along with its value. The above display would be selected if the machine was equipped with a ground alarm and you wanted it to sound when driving. There are certain settings allowed to install optional features or select the machine model.

When selection the machine model to match the size of the machine, the personality settings will all default to the factory recommended setting.

**NOTE:** Refer to Table 6-4, Personality Ranges/Defaults (Software Version P1.10), and Table 6-5, Machine Setup Descriptions in this Service Manual for the recommended factory settings.

**NOTE:** Password 33271 will give you access to Service Access, which will permit you to change all machine personality settings.

There is a setting that JLG strongly recommends that you do not change. This setting is so noted below:

### ELEVATION CUTBACK

#### **WARNING**

CHANGING THIS SETTING MAY ADVERSELY AFFECT THE PERFORMANCE OF YOUR MACHINE.

#### **NOTICE**

IT IS A GOOD PRACTICE TO AVOID PRESSURE-WASHING ELECTRICAL/ELECTRONIC COMPONENTS. SHOULD PRESSURE-WASHING BE UTILIZED TO WASH AREAS CONTAINING ELECTRICAL/ELECTRONIC COMPONENTS, JLG INDUSTRIES INC. RECOMMENDS A MAXIMUM PRESSURE OF 750 PSI (52 BAR) AT A MINIMUM DISTANCE OF 12 INCHES (30.5CM) AWAY FROM THESE COMPONENTS. IF ELECTRICAL/ELECTRONIC COMPONENTS ARE SPRAYED, SPRAYING MUST NOT BE DIRECT AND BE FOR BRIEF TIME PERIODS TO AVOID HEAVY SATURATION.

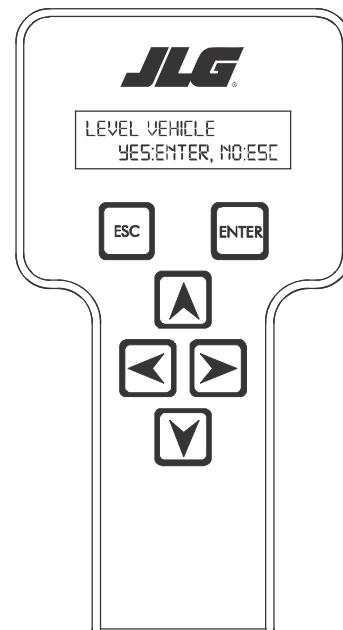
### Level Vehicle Description

#### **NOTICE**

A NEW TILT MODULE WILL ACT AS IF IT IS TILTED ALL OF THE TIME UNTIL THE FOLLOWING PROCEDURE IS PERFORMED.

#### **WARNING**

DO NOT LEVEL VEHICLE EXCEPT ON A LEVEL SURFACE.



### LEVEL VEHICLE YES:ENTER, NO:ESC

Not available at password level 2 ENTER confirms that vehicle is currently level, and zeroes the tilt sensor measurements.

## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-1. Analyzer Abbreviations**

ABBREVIATION	MEANING
ACCEL	ACCELERATE
ACT	ACTIVE
A/D	ANALOG DIGITAL CONVERTER COUNT
AMB.	AMBIENT
ANG	ANGLE
AUX	AUXILIARY
BCS	BOOM CONTROL SYSTEM
BM	BOOM LENGTH ANGLE MODULE
BLAM	BOOM LENGTH ANGLE MODULE
BR	BROKEN
BSK	BASKET
CAL	CALIBRATION
CL	CLOSED
CM	CHASSIS MODULE
CNTL	CONTROL
CNTRL	CONTROL
C/O	CUTOUT
CONT(S)	CONTRACTOR(S)
COOR	COORDINATED
CRK PT	CRACK POINT
CRP	CREEP
CUT	CUTOUT
CYL	CYLINDER
DECEL	DECELERATE
D	DOWN
DN	DOWN
DWN	DOWN
DEG.	DEGREE
DOS	DRIVE ORIENTATION SYSTEM
DRV	DRIVE
E	ERROR
E&T	ELEVATED & TILTED
ELEV	ELEVATION
ENG	ENGINE
EXT	EXTEND
F	FRONT
FL	FLOW
FNT	FRONT
FOR	FORWARD
FWD	FORWARD
FSW	FOOT SWITCH
FUNC	FUNCTION
G	GROUND

**Table 6-1. Analyzer Abbreviations**

ABBREVIATION	MEANING
GND	GROUND
GRN	GREEN
GM	GROUND MODULE
H	HOURS
HW	HARDWARE
HWFS	HARDWARE FAILSAFE
I	IN or CURRENT
JOY	JOYSTICK
L	LEFT
LB	POUND
LEN	LENGTH
LIM	LIMIT
LT	LEFT
LVL	LEVEL
M	MINUTES
MIN	MINIMUM
MAX	MAXIMUM
M	MAIN
MN	MAIN
NO	NORMALLY OPEN or NO
NC	NORMALLY CLOSED
O	OUT
O/C	OPEN CIRCUIT
OP	OPEN
O/R	OVERRIDE or OUTRIGGER
O//R	OVERRIDE
OSC	OSCILLATING
OVRD	OVERRIDE
P	PLATFORM
P	PRESSURE
PCV	PROPORTIONAL CONTROL VALVE
PLAT	PLATFORM
PLT	PLATFORM
PM	PLATFORM MODULE
POT	POTENTIOMETER
PRES	PRESSURE
PRS	PRESSURE
PT	POINT
R	REAR or RIGHT
REV	REVERSE or REVISION
RET	RETRACT
ROT.	ROTATE
RT	RIGHT

Table 6-1. Analyzer Abbreviations

ABBREVIATION	MEANING
S/C	SHORT CIRCUIT
SEL	SELECTOR
SN	SERIAL NUMBER
SPD	SPEED
STOW	STOWED
STOWD	STOWED
SW	SWITCH or SOFTWARE
TELE	TELESCOPE
TEMP	TEMPERATURE
TORQ.	TORQUE
TRN	TRANSPORT
T/T	TURNTABLE
T	TOWER
TURNTBL	TURNTABLE
TWR	TOWER
U	UPPER or UP
V	VOLT
VER	VERSION
VLV	VALVE
WIT	WITNESS
YEL	YELLOW

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## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-2. Machine Configuration Programming Information (Software Version P1.7)**

Configuration Digit	Number	Description	Default Number
<p><b>NOTE:</b> The machine configuration must be completed before any personality settings can be changed. Changing the personality settings first and then changing the model number of the machine configuration will cause the personality settings to return to default values.</p>			
MODEL NUMBER: 1	1	E300	5
	2	E400	
	3	E400N	
	4	E450	
	5	<b>E600</b>	
MARKET: 2	1	<b>ANSI USA</b>	1
	2	ANSI EXPORT	
	3	CSA	
	4	CE	
	5	AUSTRALIA	
	6	JAPAN	
	7	GB	
BATTERIES: 3* *Certain battery visibilities are dependent on model selection.	1	310AH Flooded	4
	2	375AH Flooded)	
	3	312AH AGM	
	4	<b>415AH Flooded</b>	
	5	390AH AGM)	

Table 6-2. Machine Configuration Programming Information (Software Version P1.7)

Configuration Digit	Number	Description	Default Number
TILT: 4	1	5 DEGREES+CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 5 degrees and above elevation; also disallows the tower lift up, drive, telescope out and lift up.	<b>5</b> <b>JIBMACHINES</b> <b>for ANSI USA/</b> <b>ANSI Export/</b> <b>CSA/Japan/</b> <b>CE/AUS/GB</b>  <b>6</b> <b>JIB PLUS</b> <b>MACHINES for</b> <b>ANSI USA/</b> <b>ANSI Export/</b> <b>CSA/Japan/</b> <b>CE/AUS/GB</b>
	2	4 DEGREES+CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 4 degrees and above elevation; also disallows the tower lift up, drive, telescope out and lift up.	
	3	3 DEGREES+CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 3 degrees and above elevation; also disallows the tower lift up, drive, telescope out and lift up.	
	4	5 DEGREES + DRV CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 5 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.	
	5	<b>4 DEGREES + DRV CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 4 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.</b>	
	6	<b>3 DEGREES + DRV CUT: Reduces the maximum speed of all boom functions to creep when tilted more than 3 degrees and above elevation; also reduces drive speed to creep when drive reversal is allowed, drive is disallowed otherwise.</b>	
GROUND ALARM: 5	1	NO: No ground alarm installed.	4
	2	DRIVE: Travel alarm sounds when the drive function is active.	
	3	DESCENT: Descent alarm sounds when lift down is active.	
	4	<b>MOTION: Motion alarm sounds when any function is active.</b>	
Alarm/Horn: 6	1	SEPERATE: Ambient alarm installed.	2
	2	<b>COMBINED: Single Horn / Alarm installed</b>	
JIB: 7	1	NO: No jib installed.	2
	2	<b>YES: Jib installed which has up and down movements only.</b>	
JIBSWING: 8	1	NO: No jib swing installed.	2
	2	<b>YES: Jib installed which has side to side movements.</b>	

## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-2. Machine Configuration Programming Information (Software Version P1.7)**

Configuration Digit	Number	Description	Default Number
SKYGUARD: 9	1	NO: No Sky Guard system installed.	2
	2	<b>BAR/LINE: Sky Guard BAR or LINE system installed</b>	
	3	YES: Sky Guard system installed.	
SOFT TOUCH: 10	1	<b>NO: No Soft Touch system installed.</b>	1
	2	YES: Soft Touch system installed.	
H&T LIGHTS: 11	1	<b>NO: No head and tail lights installed.</b>	1
	2	YES: Head and tail lights installed	
LOAD SYSTEM: 12* * Only visible under certain market selections. * Certain market selections will limit load system options or alter default setting.	1	NO: No load sensor installed.	3
	2	WARN ONLY: Functions in creep, overload lamp lit, platform alarm beeps(5 sec ON, 2 sec OFF).	
	3	<b>CUTOUT PLATFORM: All functions cutout, overload lamp lit, platform alarm beeps (5 sec ON, 2 sec OFF).</b>	
	4	CUTOUT ALL: All functions cutout, flash overload light (500 mS on, 500 mS off), platform alarm beeps(5 sec ON, 2 sec OFF).	
FUNCTION CUTOUT: 13* * Only visible under certain market selections. * Certain market selections will limit load system options or alter default setting.	1	<b>NO: No drive cutout.</b>	1
	2	BOOM CUTOUT: Boom function cutout while driving above elevation.	
	3	DRIVE CUTOUT: Drive and steer cutout above elevation.	
DISPLAY UNITS: 14	1	<b>METRIC</b>	1 CSA, CE, AUS, JAPAN, GB
	2	<b>IMPERIAL</b>	2 ANSI USA, ANSI Export



Table 6-2. Machine Configuration Programming Information (Software Version P1.7)

Configuration Digit	Number	Description	Default Number
ALERT BEACON: 15* * Only visible if Skyguard is selected.	1	<b>OFF FOR CREEP.</b>	1
	2	20 FPM FOR CREEP.	
TEMP CUTOUT: 16* * Certain market selection will display temp cutout options.	1	<b>NO:</b>	1
	2	YES: Low temp cutout system is installed.	
WHEEL DRIVE: 17* * Only visible if E600 model is selected.	1	4WD: Front wheel assist (4WD) system is installed.	2
	2	<b>2WD: Front wheel assist (4WD) system is not installed.</b>	
CHARGER INTERLOCK: 18	1	<b>DRIVE ONLY: Drive function is disabled when battery charger is plugged in.</b>	1
	2	CUTOUT ALL: Drive and bottom function is disabled when battery charger is plugged in.	
PLAT LVL OVR CUT: 19	1	<b>NO: Platform level functions above elevation.</b>	1
	2	YES: Platform level does not function above elevation.	

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## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-3. Machine Configuration Programming Settings  
(Software Version P1.7)**

EC/H600	ANSI USA	ANSI Export	CSA	CE	Australia	Japan
Model Number	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>
Market	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Batteries	X	X	X	X	X	X
	X	X	X	X	X	X
	X	X	X	X	X	X
	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
	5	5	5	5	5	5
Tilt 2, <b>5</b> for "J" 3, <b>6</b> for "JP"	X	X	X	X	X	X
	2	2	2	2	2	2
	3	3	3	3	3	3
	X	X	X	X	X	X
	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>
	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>
Ground Alarm	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
Alarm/Horn	1	1	1	1	1	1
	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
Jib	1	1	1	1	1	1
	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
Jib Swing	1	1	1	1	1	1
	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
Skyguard	1	1	1	1	1	1
	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
	3	3	3	3	3	3
Soft Touch	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	2	2	2	2	2	2
Head & Tail Lights	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	2	2	2	2	2	2
Load System	X	X	X	X	X	X
	X	X	X	X	X	X
	<b>3</b>	<b>3</b>	<b>3</b>	X	<b>3</b>	<b>3</b>
	4	4	4	<b>4</b>	X	4
Function Cutout	<b>1</b>	<b>1</b>	<b>1</b>	X	<b>1</b>	<b>1</b>
	X	2	2	<b>2</b>	2	2
	3	3	3	X	3	3

**Table 6-3. Machine Configuration Programming Settings  
(Software Version P1.7)**

EC/H600	ANSI USA	ANSI Export	CSA	CE	Australia	Japan
Display Units	1	1	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	<b>2</b>	<b>2</b>	2	2	2	2
Alert Beacon	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	2	2	2	2	2	2
Temp Cutout	X	<b>1</b>	X	<b>1</b>	X	X
	X	2	X	2	X	X
Wheel Drive	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	2	2	2	2	2	2
Charger Interlock	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	2	2	2	2	2	2
Plat Lvl Over Cut	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
	2	2	2	2	2	2

**BOLD TEXT** indicates the default setting. Plain text indicates another available selection. *ITALIC text* indicates the default when option is factory installed. SHADED CELLS indicate hidden menu or selection.

### 6.3 MACHINE PERSONALITY SETTINGS

**NOTE:** Personality settings can be adjusted within the adjustment range in order to achieve optimum machine performance. Machine Orientation When performing test

**Table 6-4. Personality Ranges/Defaults (Software Version P1.10)**

FUNCTION	PERSONALITY	RANGE	DEFAULTS
DRIVE	ACCEleration	0.5 to 5.0s	2.0s
	DECEleration	0.3 to 5.0s	3.0s
	DECEleration to stop	0.3 to 2.0s	1.0s
	MAXimum speed	75 to 100%	100%
	REDUCED MAXimum speed and MAXimum Reverse Drive	50 to 70%	50%
	ELEVATED MAXimum speed (ANSI)	5 to 15%	7%
	ELEVATED MAXimum speed (CE)	5 to 15%	7%
	CREEP MAXimum speed	5 to 15%	10%
STEER	ACCEleration	0.1 to 5.0s	0.5s
	DECEleration	0.1 to 5.0s	0.1s
	MINimum LEFT speed	10 to 50%	45%
	MAXimum LEFT speed	51 to 100%	58%
	MINimum RIGHT speed	10 to 50%	45%
	MAXimum RIGHT speed	51 to 100%	58%
	PUMP MAX	16 to 100%	25%
SWING	ACCEleration	0.1 to 5.0s	2.0s
	DECEleration	0.1 to 5.0s	1.0s
	MINimum LEFT speed	30 to 45%	38%
	MAXimum LEFT speed	47 to 100%	50%
	CREEP Maximum LEFT speed	31 to 46%	42%
	MINimum RIGHT speed	30 to 45%	38%
	MAXimum RIGHT speed	47 to 100%	50%
	CREEP maximum RIGHT speed	31 to 46%	42%
	PUMP MAX	16 to 100%	16%

## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-4. Personality Ranges/Defaults (Software Version P1.10)**

FUNCTION	PERSONALITY	RANGE	DEFAULTS
BOOMLIFT	ACCEleration	0.1 to 5.0s	2.0s
	DECEleration	0.1 to 5.0s	1.5s
	MINimum UP speed	40 to 55%	48%
	MAXimum UP speed	57 to 70%	69%
	CREEP maximum UP speed	41 to 56%	55%
	MINimum DOWN speed	40 to 55%	48%
	MAXimum DOWN speed	57 to 70%	69%
	CREEP maximum DOWN speed	41 to 56%	52%
	MAXimum PUMP Up	16 to 90%	85%
	MAXimum PUMP Down	16 to 50%	48%
TOWER LIFT	ACCEleration	N/A	N/A
	DECEleration	N/A	N/A
	MINimum UP speed	N/A	N/A
	MAXimum UP speed	N/A	N/A
	CREEP maximum UP speed	N/A	N/A
	MINimum DOWN speed	N/A	N/A
	MAXimum DOWN speed	N/A	N/A
	CREEP maximum DOWN speed	N/A	N/A
TELESCOPE	ACCEleration	0.1 to 5.0s	1.5s
	DECEleration	0.1 to 5.0s	1.5s
	MINimum IN speed	40 to 50%	45%
	MAXimum IN speed	56 to 70%	65%
	CREEP maximum IN speed	41 to 55%	52%
	MINimum OUT speed	40 to 50%	46%
	MAXimum OUT speed	56 to 70%	69%
	CREEP maximum OUT speed	41 to 55%	52%
	IN PUMP MAX	16 to 65%	60%
	OUT PUMP MAX	16 to 65%	60%

Table 6-4. Personality Ranges/Defaults (Software Version P1.10)

FUNCTION	PERSONALITY	RANGE	DEFAULTS
JIB LIFT	ACCEleration	0.1 to 5.0s	1.5s
	DECEleration	0.1 to 5.0s	0.5s
	MINimum UP speed	40 to 50%	45%
	MAXimum UP speed	53 to 100%	55%
	CREEP maximum UP speed	41 to 52%	48%
	MINimum DOWN speed	40 to 50%	45%
	MAXimum DOWN speed	53 to 100%	55%
	CREEP maximum DOWN speed	41 to 52%	52%
	UP Pump Max	16 to 100%	27%
	Down Pump Max	16 to 100%	18%
JIB SWING	ACCEleration	0.1 to 5.0s	0.5s
	DECEleration	0.1 to 5.0s	0.5s
	MINimum LEFT speed	40 to 49%	46%
	MAXimum LEFT speed	51 to 100%	55%
	CREEP Maximum LEFT speed	41 to 50%	48%
	MINimum RIGHT speed	40 to 49%	46%
	MAXimum RIGHT speed	51 to 100%	55%
	CREEP maximum RIGHT speed	41 to 50%	48%
	Pump Max	16 to 25%	16%
PLATFORM LEVEL	ACCEleration	0.1 to 5.0s	0.5s
	DECEleration	0.1 to 5.0s	0.5s
	MINimum UP speed	35 to 50%	42%
	MAXimum UP speed	52 to 100%	55%
	CREEP maximum UP speed	36 to 51%	50%
	MINimum DOWN speed	35 to 50%	42%
	MAXimum DOWN speed	52 to 100%	55%
	CREEP maximum DOWN speed	36 to 51%	50%
	UP Pump Max	16 to 100%	30%
	Down Pump Max	16 to 100%	16%

## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-4. Personality Ranges/Defaults (Software Version P1.10)**

FUNCTION	PERSONALITY	RANGE	DEFAULTS
PLATFORM ROTATE	ACCEleration	0.1 to 5.0s	0.5s
	DECEleration	0.1 to 5.0s	0.5s
	MINimum LEFT speed	40 to 50%	46%
	MAXimum LEFT speed	52 to 100%	52%
	CREEP Maximum LEFT speed	41 to 51%	47%
	MINimum RIGHT speed	40 to 50%	46%
	MAXimum RIGHT speed	52 to 100%	52%
	CREEP maximum RIGHT speed	41 to 51%	47%
	Pump Max	16 to 100%	16%
GROUND MODE	Swing	46 to 99%	49%
	Tower UP	N/A	N/A
	Tower Down	N/A	N/A
	Lift UP	56 to 69%	68%
	Lift DOWN	56 to 69%	68%
	Telescope IN	55 to 69%	64%
	Telescope OUT	55 to 69%	68%
	Jib UP	51 to 99%	54%
	Jib DOWN	51 to 99%	54%
	Jib SWING	50 to 99%	54%
	Platform LEVEL	46 to 99%	54%
	Platform ROTATE	51 to 99%	51%
ALARM/HORN	Volume HORN	25 to 100%	100%
	Volume ALARM	25 to 100%	75%
TEMPERATURE CUT	LOW Cutout set	-30 to 0C	-30C
	OFFset	0 to 10C	5C

1001201627-D

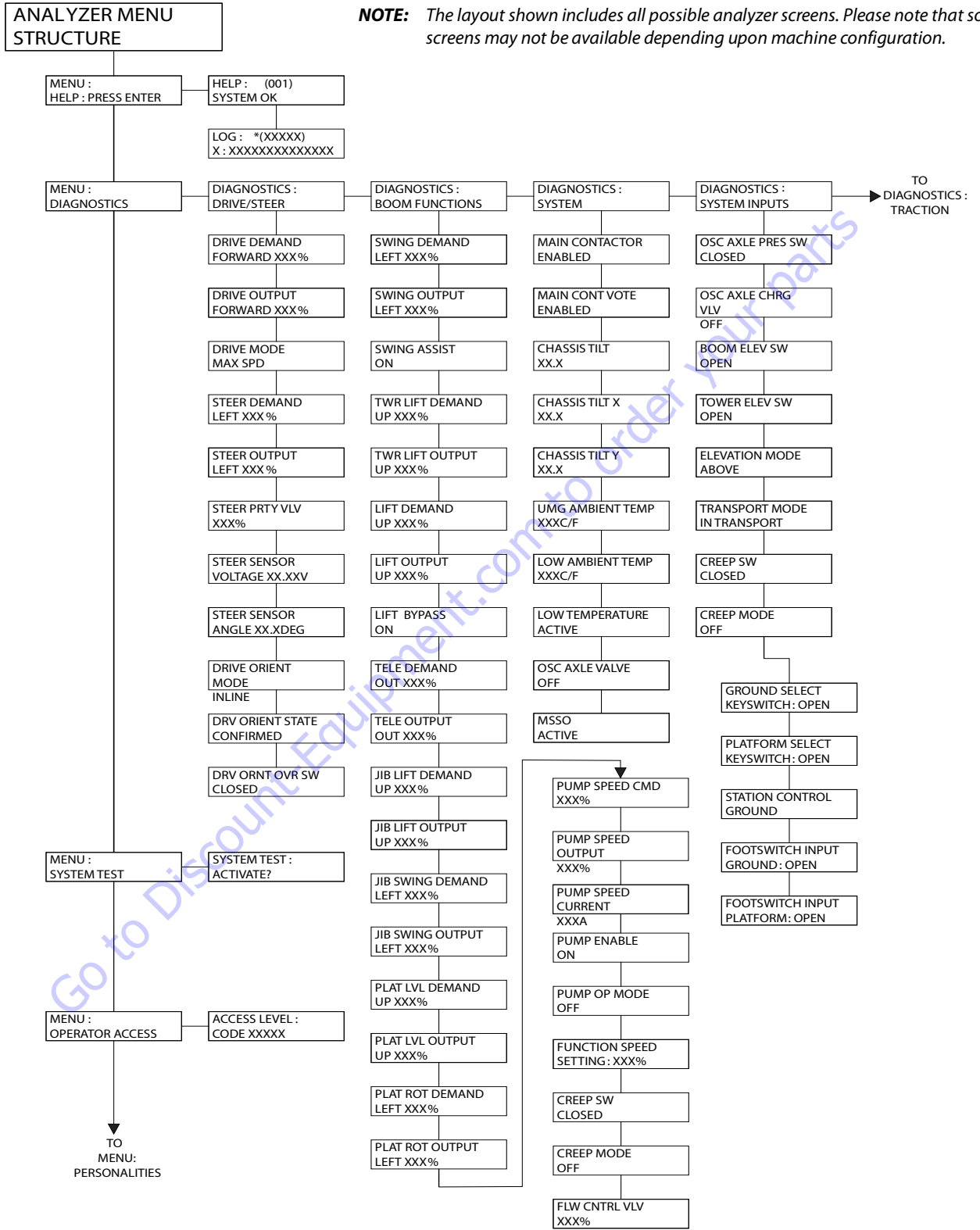
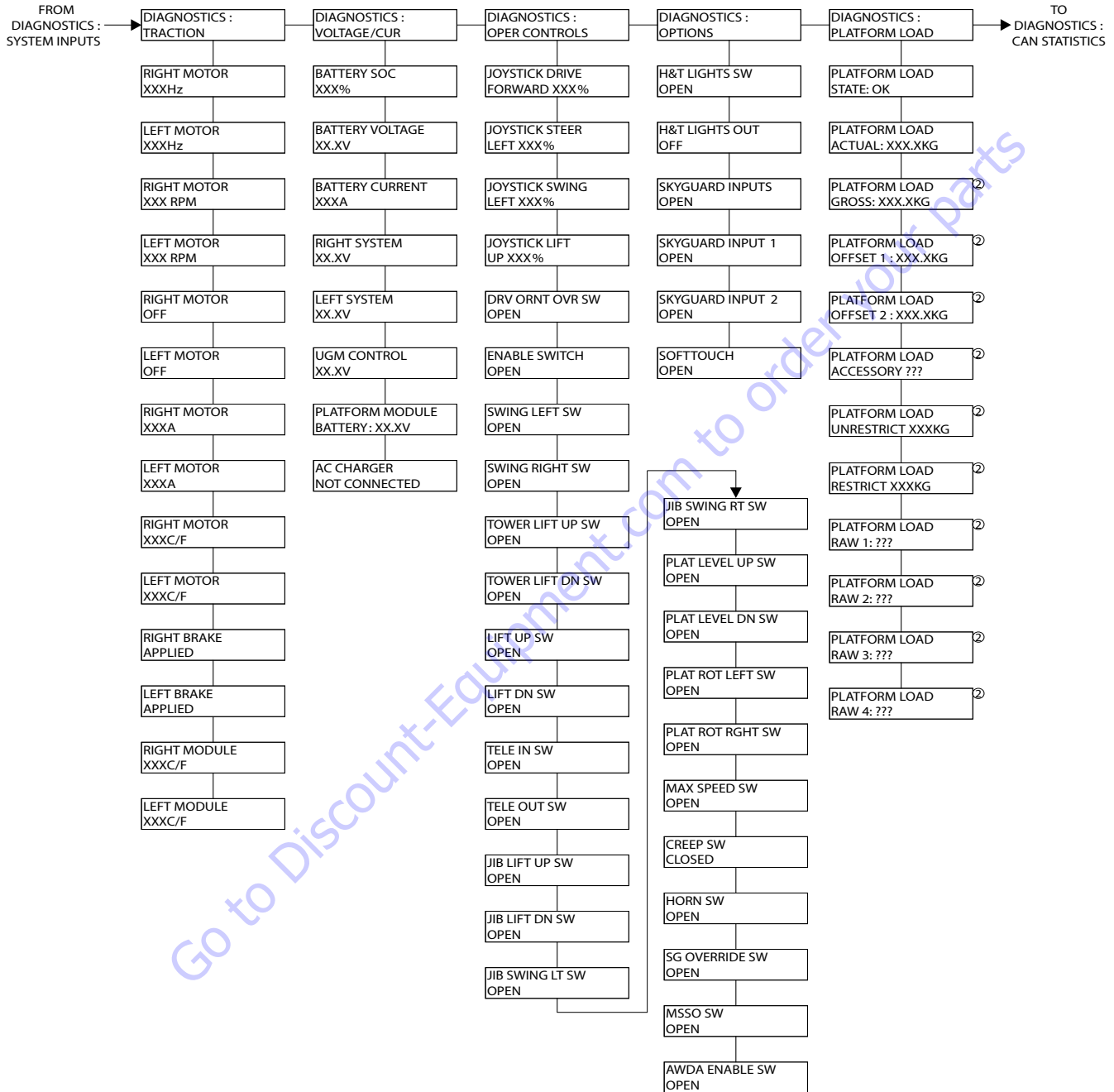


Figure 6-2. Analyzer Flow Chart, Version 1.10 - Sheet 1 of 5

1001187146-M  
MAF12490M

**SECTION 6 - JLG CONTROL SYSTEM**

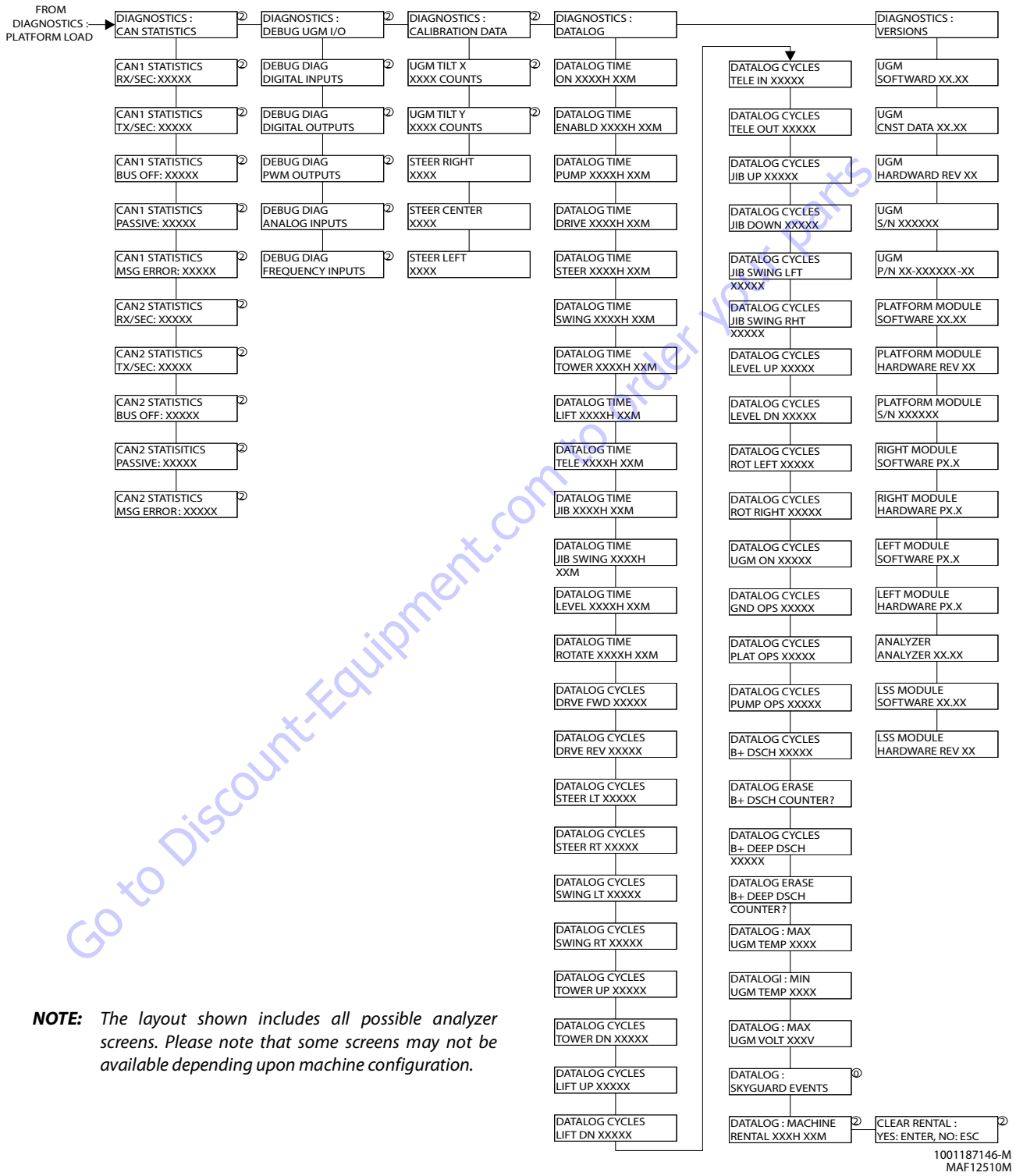


1001187146-M  
MAF12500M

**NOTE:** The layout shown includes all possible analyzer screens. Please note that some screens may not be available depending upon machine configuration.

**Figure 6-3. Analyzer Flow Chart, Version 1.10 - Sheet 2 of 5**

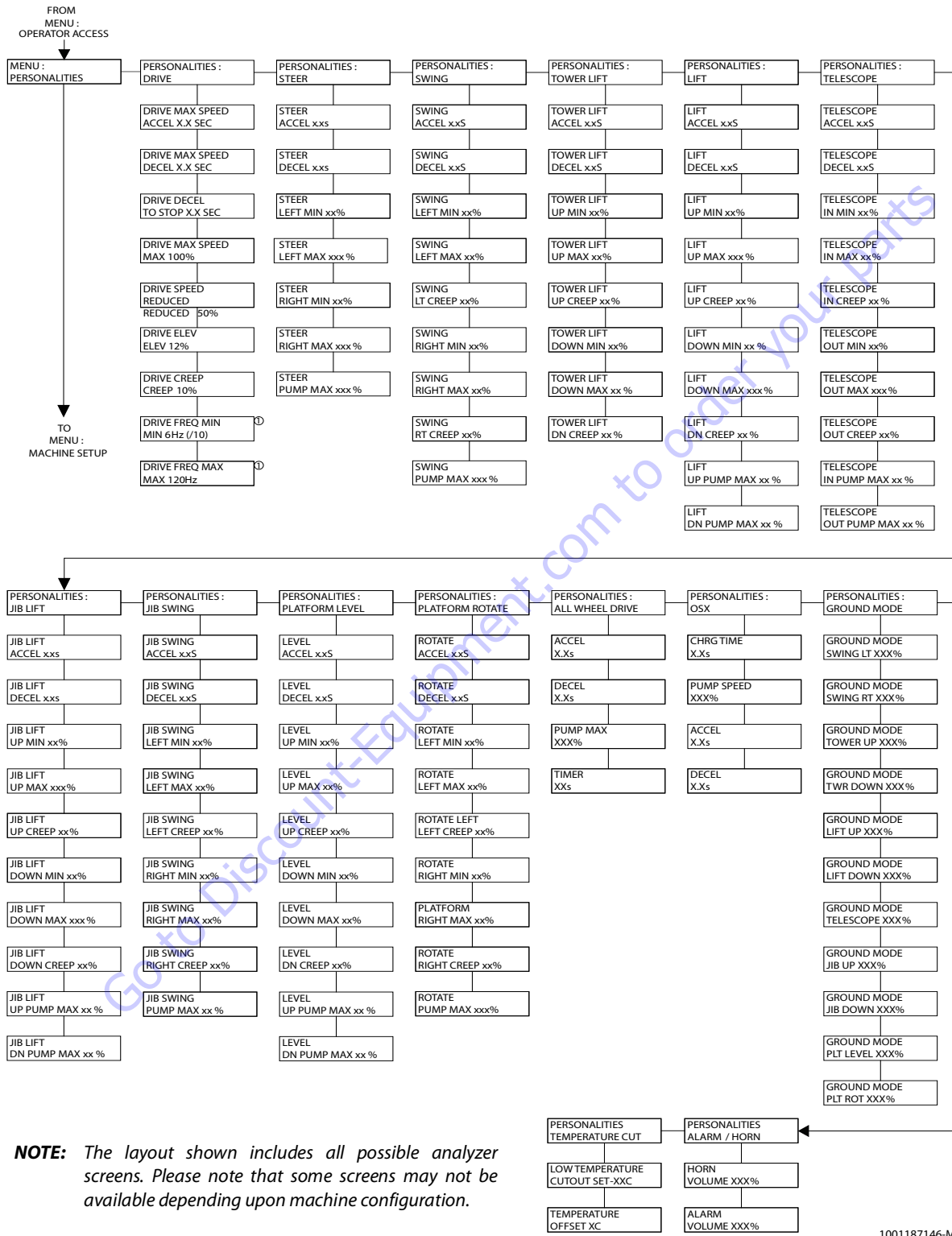




**NOTE:** The layout shown includes all possible analyzer screens. Please note that some screens may not be available depending upon machine configuration.

Figure 6-4. Analyzer Flow Chart, Version 1.10 - Sheet 3 of 5

**SECTION 6 - JLG CONTROL SYSTEM**



**Figure 6-5. Analyzer Flow Chart, Version 1.10 - Sheet 4 of 5**

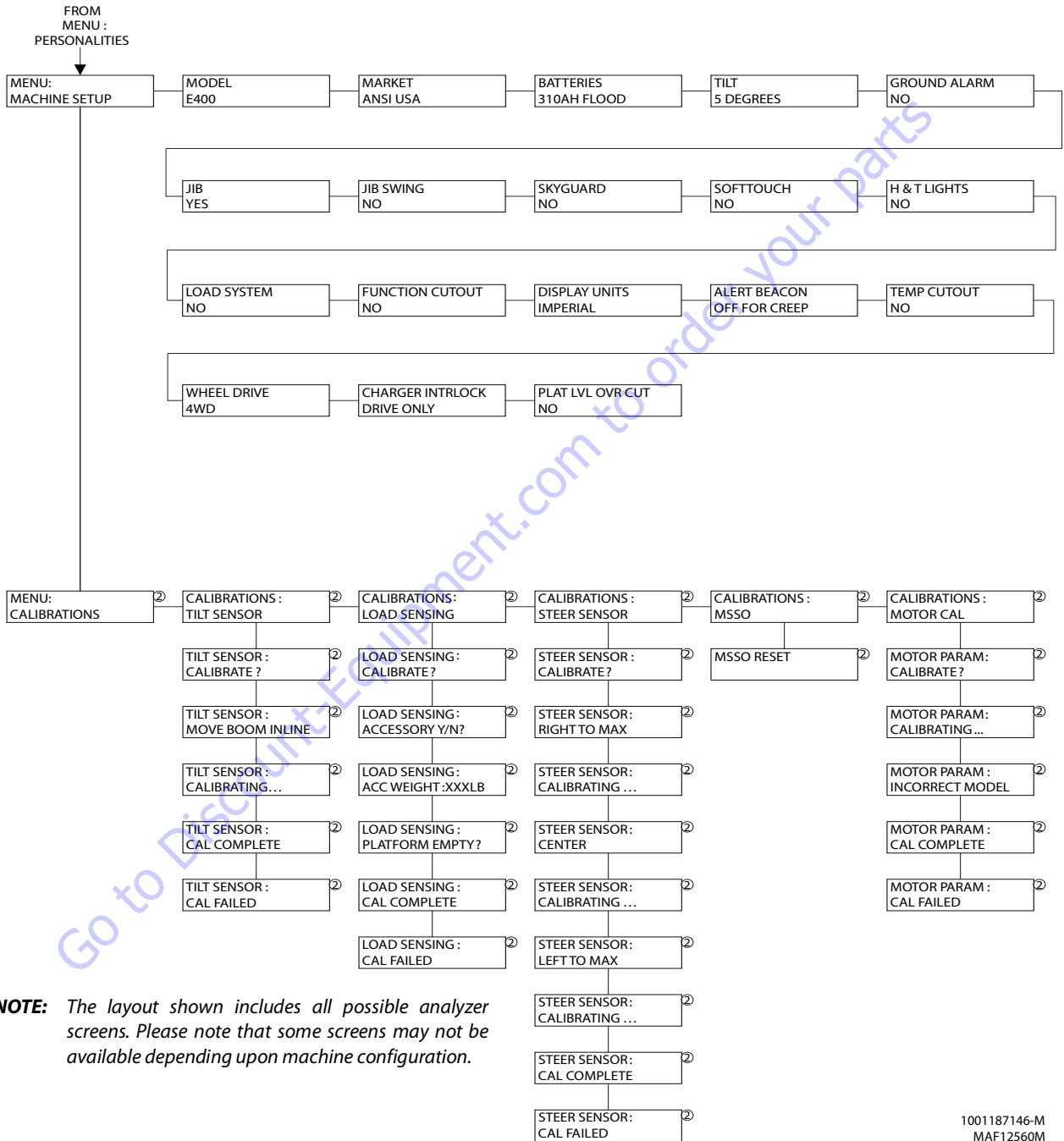


Figure 6-6. Analyzer Flow Chart, Version 1.10 - Sheet 5 of 5

### 6.4 MACHINE ORIENTATION WHEN PERFORMING TEST

**Drive (Below elevation):** Test should be done on a smooth, level surface. The Drive select switch should be in the "Max Speed" position. Start approximately 25ft (7.6m) from starting point so the unit is at a maximum speed when starting the test. Result should be recorded for a 200ft (61m) course. Drive Forward, "High speed", record time. Drive Reverse, "High speed", record time.

**Drive Reduced (below elevation):** Test should be done on a smooth, level surface. The Drive select switch should be in the "Reduced Speed" position. Start approximately 25ft (7.6m) from starting point so the unit is at a maximum speed when starting the test. Result should be recorded for a 200ft (61m) course. Drive Forward, "Reduced speed", record Time. Drive Reverse, "Reduced speed", record Time.

**Drive (above elevation):** Test should be done on a smooth, level surface. The drive select switch should be in the "Max Speed" position, the boom should be >10° above horizontal to ensure the drive is operating in elevated mode. Result should be recorded for a 50ft (15.2m) course. Drive Forward, Record Time. Drive reverse, Record Time.

**Swing:** Boom at full elevation, Telescope retracted. Swing turntable right to end stop. Swing Left to end stop, record time. Swing Right to end stop, record time. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode; Creep light on Panel must be energized. Verify that machine will Swing left and right. Return Knob to fully clockwise.

**Tower Lift:** Tower Lift in stowed position, Telescope Retracted, Main lift horizontal. Tower Lift Up, record time. Tower Lift Down, record time. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode; Creep light on Panel must be energized. Verify that machine will Tower Up and Down. Return Knob to fully clockwise.

**Main lift:** Main Lift in stowed position Tower Lift in stowed position, Telescope Retracted. Main Lift Up, record time. Main Lift Down, record time. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode; Creep light on Panel must be energized. Verify that machine will Lift Up and Down. Return Knob to fully clockwise.

**Telescope:** Main Lift at full elevation, Telescope Retracted. Telescope Out, record time. Telescope In, record time. Turn Platform Speed Control Knob fully counterclockwise to enter creep mode; creep light on Panel must be energized. Verify that machine will Telescope Up and Down. Return Knob to fully clockwise.

**Jib Lift:** Platform level and centered with boom. Jib Lift Down until stop. Jib Lift Up, record time. Jib Lift Down, record time. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode; Creep light on Panel must be energized. Verify that machine will Jib Lift Up and Down. Return Knob to fully clockwise.

**Jib Swing:** Platform level and centered with boom. Jib Lift Horizontal and swing fully to left stop. Swing right to end stop, record time. Swing left to end stop, record time. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode; Creep light on Panel must be energized. Verify that machine will Jib swing left and right. Return Knob to fully clockwise.

**Platform Rotate:** Platform level, Rotate Platform Right until stop. Platform Left, record time. Platform Right, record time. Turn Platform Speed Control Knob fully counterclockwise to enter Creep mode; Creep light on Panel must be energized. Verify that machine will Platform Rotate Left and Right. Return Knob to fully clockwise.

#### Test Notes

1. Stop watch should be started with the function movement, not with actuation of joystick and switch.
2. Drive speeds should be set to the values below regardless of the tire size.
3. All speed tests are run from the platform. These speeds do not reflect the ground control operation.
4. The platform speed knob control must be at full speed (turned clockwise completely).
5. Some flow control functions may not work with the Platform Speed Control knob clicked into the creep position.
6. Functional speeds may vary due to cold, thick hydraulic oil. Test should be run with the oil temperature above 100° F (38° C).

Table 6-5. Machine Setup Descriptions

MODEL NUMBER	Displays/adjusts machine model NOTE: all personalities reset to default when model number is altered
TILT	Displays/adjusts tilt sensor function
DRIVE CUTOUT	Displays/adjusts drive cutout switch presence/function
FUNCTION CUTOUT	Displays/adjusts function cutout switch presence/function
JIB	Displays/adjusts jib presence
GROUND ALARM	Displays/adjusts ground alarm presence/function
4WD ASSIST	Displays/adjusts 4WD assist presence
SOFT TOUCH	Displays/adjusts soft-touch system presence

## Help Descriptions and Fault Flash Codes

Table 6-6. JLG Control System Flash Codes

Code	Description
2-1	Faulty Footswitch/EMS
2-2	Drive/Steer inputs/Footswitch Interlocks
2-3	Boom function inputs/Lift-Swing Joystick
2-5	Function Cutout/Drive Cutout
3-1	Contactors miswired/Motors miswired
3-2	Line contactor welded
3-3	Contactor short circuit or valve short circuit
4-2	Controller Overtemperature
4-4	Battery voltage out of range
6-6	CANbus inputs
7-7	Traction / Pump motor wiring or motor faulty
9-9	Problem with Controller

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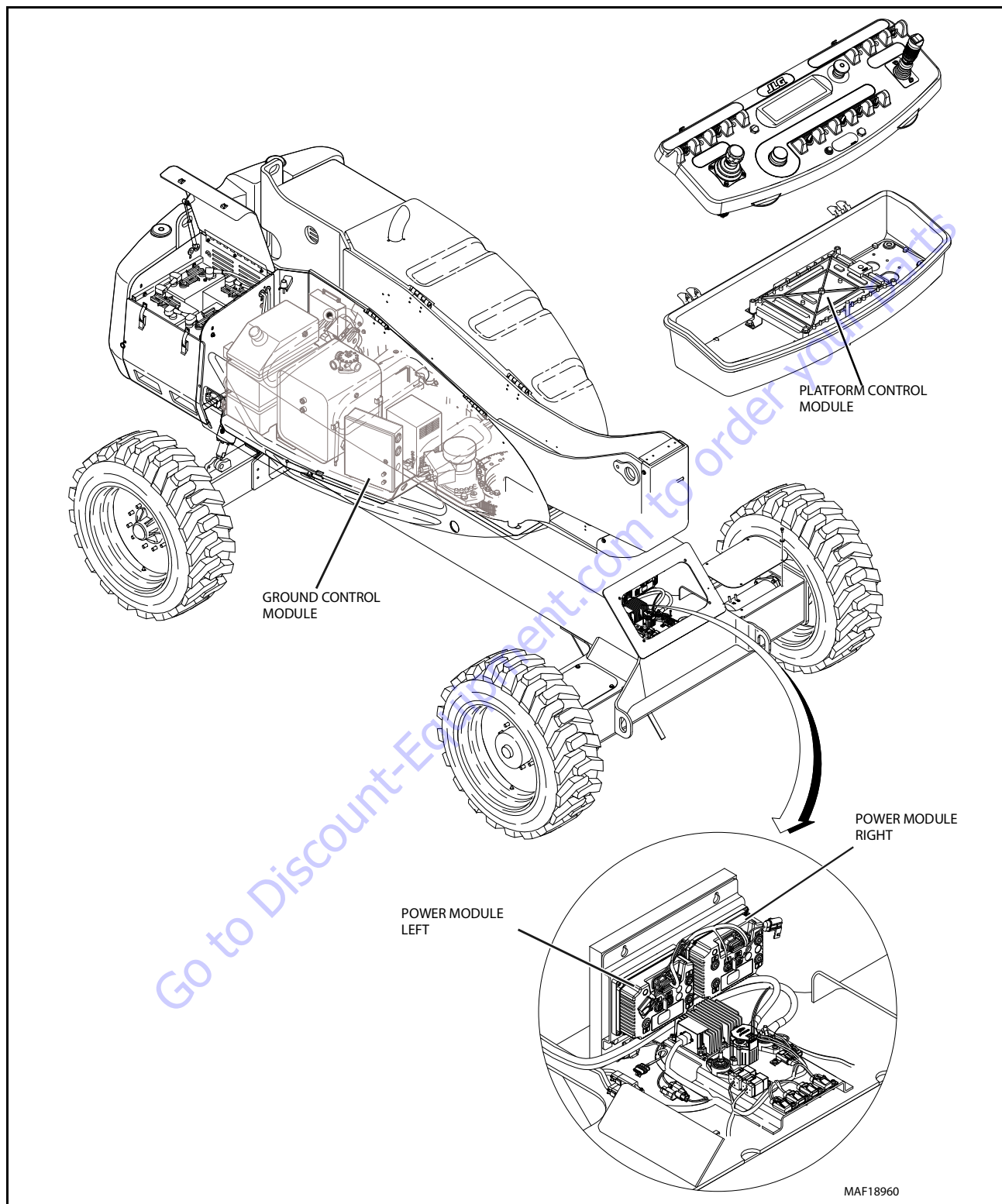
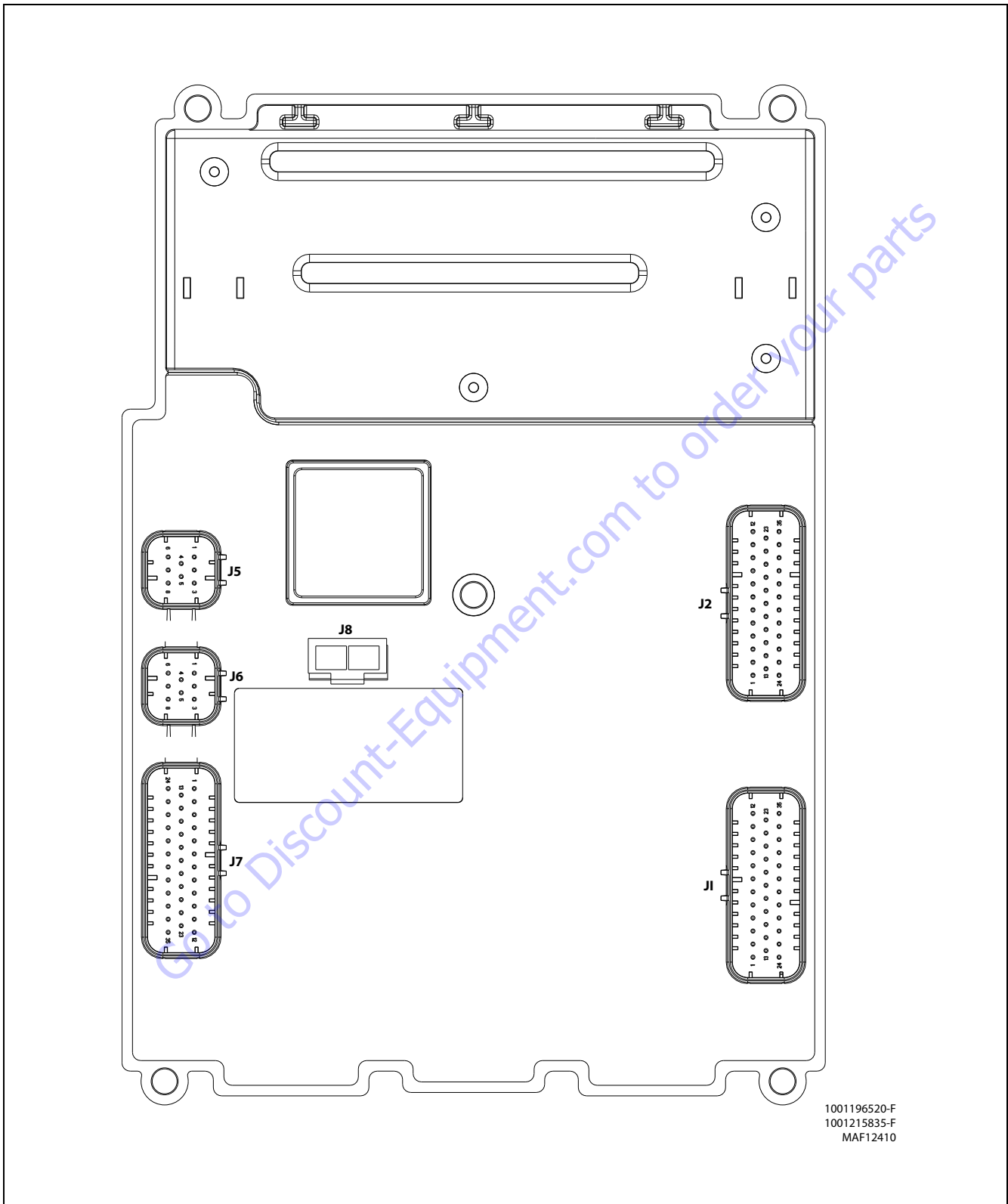


Figure 6-7. Control Module Location





Figure 6-8. Analyzer Connecting Points



1001196520-F  
1001215835-F  
MAF12410

Figure 6-9. Platform Control Module



Connector	Pin	ASSIGNMENT	FUNCTION
<b>J1 (Natural)</b>	1	TOWER LIFT UP	DIGITAL INPUT
	2	TOWER LIFT DOWN	DIGITAL INPUT
	3	UNUSED (TOWER TELESCOPE IN)	DIGITAL INPUT
	4	UNUSED (TOWER TELESCOPE OUT)	DIGITAL INPUT
	5	MAIN TELESCOPE IN	DIGITAL INPUT
	6	MAIN TELESCOPE OUT	DIGITAL INPUT
	7	PLATFORM ROTATE RIGHT	DIGITAL INPUT
	8	PLATFORM ROTATE LEFT	DIGITAL INPUT
	9	PLATFORM LEVEL UP	DIGITAL INPUT
	10	PLATFORM LEVEL DOWN	DIGITAL INPUT
	11	JIB UP	DIGITAL INPUT
	12	JIB DOWN	DIGITAL INPUT
	13	SPEED PUMP POTENTIOMETER GROUND	GROUND
	14	UNUSED (ENGINE START)	DIGITAL INPUT
	15	UNUSED (AUXILIARY DESCENT)	DIGITAL INPUT
	16	UNUSED (CRAB STEER SELECT)	DIGITAL INPUT
	17	UNUSED (COORDINATED STEER SELECT)	DIGITAL INPUT
	18	SWITCH POWER	BATTERY VOLTAGE
	19	UNALLOCATED	DIGITAL INPUT
	20	SOFT TOUCH SWITCH	DIGITAL INPUT
	21	UNALLOCATED	DIGITAL INPUT
	22	UNALLOCATED	DIGITAL INPUT
	23	SKYGUARD INPUT #2	DIGITAL INPUT
	24	UNALLOCATED	DIGITAL INPUT
	25	UNALLOCATED	DIGITAL INPUT
	26	UNALLOCATED	DIGITAL INPUT
	27	SPEED MODE	DIGITAL INPUT
	28	UNUSED (TORQUE MODE (LOW ENGINE))	DIGITAL INPUT
	29	SOFT TOUCH/SKYGUARD OVERRIDE	DIGITAL INPUT
	30	HEAD/TAIL LIGHT	DIGITAL INPUT
	31	HORN	DIGITAL INPUT
	32	CREEP MODE	DIGITAL INPUT
	33	UNUSED (GENSET ENABLE/DISABLE)	DIGITAL INPUT
	34	SPEED PUMP POTENTIOMETER REFERENCE VOLTAGE	+7 REFERENCE VOLTAGE
	35	SPEED PUMP POTENTIOMETER	ANALOG INPUT

Connector	Pin	ASSIGNMENT	FUNCTION
<b>J2 (Gray)</b>	1	UNALLOCATED (JIB RT)	DIGITAL INPUT
	2	UNALLOCATED (JIB LT)	DIGITAL INPUT
	3	UNUSED (BATTERY VOLTAGE)	BATTERY VOLTAGE
	4	DRIVE ORIENTATION SYSTEM OVERRIDE SWITCH	HS DIGITAL INPUT
	5	UNALLOCATED (BASKET STOW SWITCH)	DIGITAL INPUT
	6	CHASSIS TILTED INDICATOR	LAMP OUTPUT
	7	FUNCTION ENABLE INDICATOR	LAMP OUTPUT
	8	VEHICLE SYSTEM DISTRESS INDICATOR	LAMP OUTPUT
	9	CREEP SPEED INDICATOR	LAMP OUTPUT
	10	UNUSED (BROKEN CABLE INDICATOR)	LAMP OUTPUT
	11	PLATFORM OVERLOADED INDICATOR	LAMP OUTPUT
	12	UNUSED (500 LB CAPACITY INDICATOR)	LAMP OUTPUT
	13	LOW BATTERY INDICATOR	LAMP OUTPUT
	14	DRIVE ORIENTATION SYSTEM INDICATOR	LAMP OUTPUT
	15	UNUSED (GENERATOR ON INDICATOR)	LAMP OUTPUT
	16	SKYGUARD INDICATOR	LAMP OUTPUT
	17	UNUSED (GLOW PLUG ENGAGED INDICATOR)	LAMP OUTPUT
	18	LAMP RETURN	GROUND
	19	SOFT TOUCH INDICATOR	LAMP OUTPUT
	20	UNUSED	LAMP OUTPUT
	21	UNUSED (LOW FUEL INDICATOR)	LAMP OUTPUT
	22	1/4 BAT CHG INDICATOR	LAMP OUTPUT
	23	3/4 BAT CHG INDICATOR	LAMP OUTPUT
	24	1/2 BAT CHG INDICATOR	LAMP OUTPUT
	25	BAT CHG INDICATORS RETURN	GROUND
	26	ANALYZER POWER	ANALYZER POWER
	27	ANALYZER GROUND	ANALYZER GROUND
	28	ANALYZER RX	ANALYZER RX
	29	ANALYZER TX	ANALYZER TX
	30	UNUSED (BATTERY VOLTAGE)	BATTERY VOLTAGE
	31	SOFT TOUCH POWER	BATTERY VOLTAGE
	32	LSS POWER	BATTERY VOLTAGE
	33	UNUSED (PLT DISP POWER)	BATTERY VOLTAGE
	34	UNUSED (SWITCH POWER)	BATTERY VOLTAGE
	35	FULL BAT CHG INDICATOR	LAMP OUTPUT

## SECTION 6 - JLG CONTROL SYSTEM

Connector	Pin	ASSIGNMENT	FUNCTION
<b>J5</b> (Natural)	1	LIFT / SWING JOYSTICK SUPPLY VOLTAGE	SUPPLY VOLTAGE
	2	LIFT CENTER TAP	ANALOG INPUT
	3	LIFT SIGNAL	ANALOG INPUT
	4	SWING SIGNAL	ANALOG INPUT
	5	SWING CENTER TAP	ANALOG INPUT
	6	UNUSED	ANALOG INPUT
	7	LIFT / SWING JOYSTICK RETURN	GROUND
	8	UNUSED	GROUND

Connector	Pin	ASSIGNMENT	FUNCTION
<b>J6</b> (Black)	1	DRIVE / STEER JOYSTICK SUPPLY VOLTAGE	SUPPLY VOLTAGE
	2	DRIVE CENTER TAP	ANALOG INPUT
	3	DRIVE SIGNAL	ANALOG INPUT
	4	UNUSED	ANALOG INPUT
	5	STEER LEFT	ANALOG INPUT
	6	STEER RIGHT	ANALOG INPUT
	7	DRIVE / STEER JOYSTICK RETURN	GROUND
	8	UNUSED	GROUND

Connector	Pin	ASSIGNMENT	FUNCTION
<b>J8</b>	1	MODULE GROUND	GROUND
	2	MODULE POWER	BATTERY VOLTAGE

Connector	Pin	ASSIGNMENT	FUNCTION
<b>J7</b> (Black)	1	GROUND MODE	PLATFORM EMS
	2	PLATFORM EMS	PLATFORM MODE
	3	PLATFORM EMS TO GROUND MODULE	GROUND MODE
	4	FOOTSWITCH (FUNCTION ENABLE SWITCH) POWER	BATTERY VOLTAGE
	5	UNUSED (INVERTER SWITCH POWER)	BATTERY VOLTAGE
	6	UNUSED (JIB BLOCK LIMIT SWITCH POWER)	BATTERY VOLTAGE
	7	SKYGUARD POWER	BATTERY VOLTAGE
	8	FOOTSWITCH SIGNAL	DIGITAL INPUT
	9	UNUSED (INVERTER ON SIGNAL)	DIGITAL INPUT
	10	UNUSED (+7 REFERENCE VOLTAGE)	+7 REFERENCE VOLTAGE
	11	UNUSED (LOAD CELL INPUT 1)	ANALOG INPUT
	12	UNUSED (LOAD CELL INPUT 2)	ANALOG INPUT
	13	UNALLOCATED	ANALOG INPUT
	14	UNUSED (GROUND RETURN)	GROUND
	15	UNUSED (LOAD CELL REFERENCE VOLTAGE)	+7 REFERENCE VOLTAGE
	16	LOAD CELL RETURN	GROUND
	17	UNUSED (JIB BLOCK LIMIT SWITCH)	HS DIGITAL INPUT
	18	SKYGUARD INPUT #1	HS DIGITAL INPUT
	19	PLATFORM ALARM	LAMP OUTPUT
	20	PLATFORM ALARM RETURN	GROUND
	21	PLATFORM LEVEL UP	ME DIGITAL OUTPUT
	22	PLATFORM LEVEL DOWN	ME DIGITAL OUTPUT
	23	VALVE RETURN	GROUND
	24	SKYGUARD RETURN	GROUND
	25	JIB UP	ME DIGITAL OUTPUT
	26	JIB DOWN	ME DIGITAL OUTPUT
	27	JIB RIGHT	ME DIGITAL OUTPUT
	28	JIB LEFT	ME DIGITAL OUTPUT
	29	PLT DISP RETURN	GROUND
	30	CAN LOW	CAN LOW
	31	CAN HIGH	CAN HIGH
	32	CAN SHIELD	CAN SHIELD
	33	PLATFORM ROTATE LEFT	ME DIGITAL OUTPUT
	34	PLATFORM ROTATE RIGHT	ME DIGITAL OUTPUT
	35	UNUSED (GROUND RETURN)	GROUND

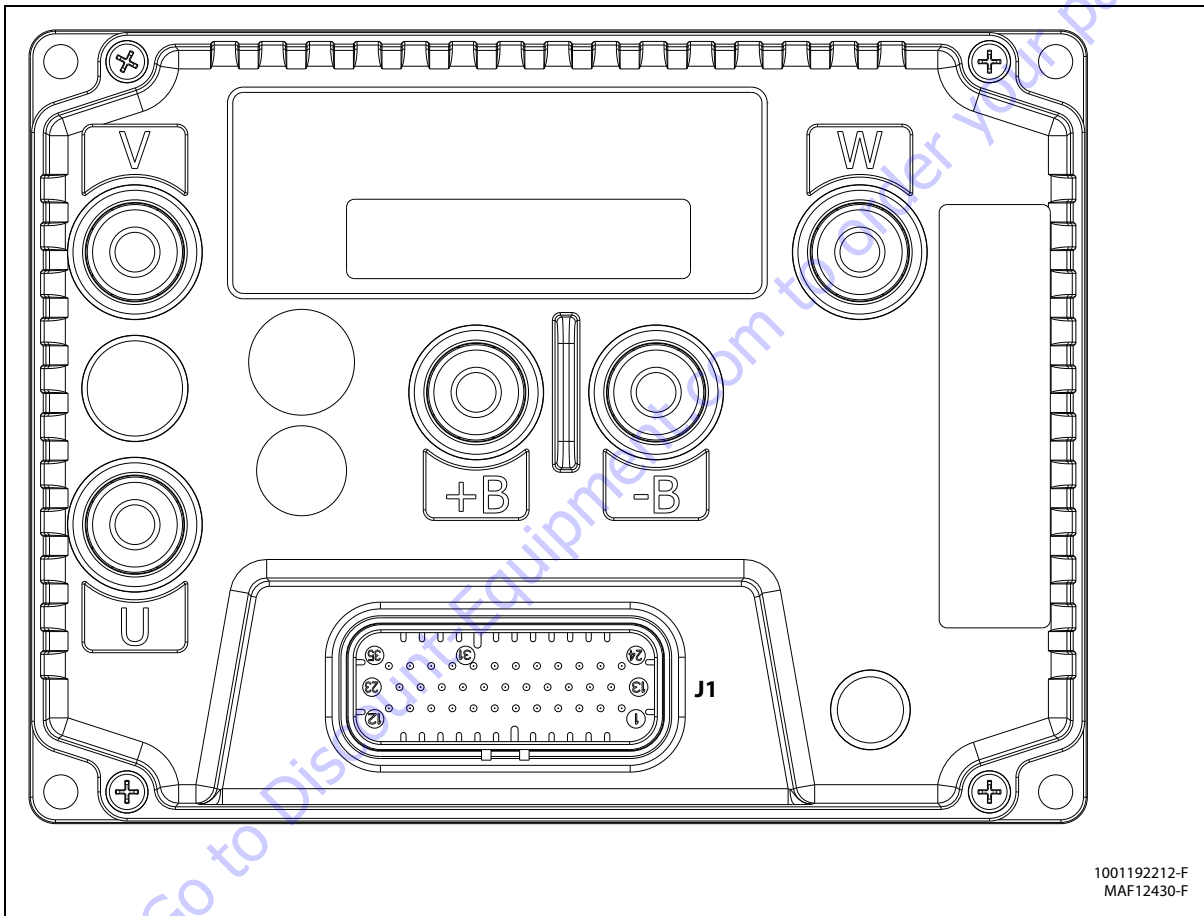


Figure 6-10. Power Module - LH

Connector	Pin	Function	Type	
J1	1	UNUSED	DIGITAL	INPUT
	2	ELECTRO BRAKE	DIGITAL	OUTPUT
	3	ELECTRO BRAKE SUPPLY (POS)	VBAT	INPUT
	4	ELECTRO BRAKE DRIVER (NEG)	PWM	OUTPUT
	5	SENSOR GROUND	GROUND	INPUT
	6	MODULE ADDRESS	DIGITAL	INPUT
	7	UNUSED	DIGITAL	INPUT
	8	UNUSED	DIGITAL	OUTPUT
	9	UNUSED	DIGITAL	OUTPUT
	10	KEY SWITCH (IGNITION)	DIGITAL	INPUT
	11	UNUSED	DIGITAL	OUTPUT
	12	UNUSED	PWM	OUTPUT
	13	WHEEL ENCODER PIN B	DIGITAL	INPUT
	14	WHEEL ENCODER PIN A	DIGITAL	INPUT
	15	UNUSED	ANALOG	INPUT
	16	UNUSED	DIGITAL	INPUT
	17	UNUSED	DIGITAL	INPUT
	18	UNUSED	DIGITAL	INPUT
	19	UNUSED	DIGITAL	INPUT
	20	UNUSED	DIGITAL	INPUT
	21	UNUSED	DIGITAL	INPUT
	22	MOTOR THERMAL SENSOR	ANALOG	INPUT
	23	UNUSED	PWM	OUTPUT
	24	UNUSED	PWM	OUTPUT
	25	WHEEL ENCODER POWER (+5 VOLTS)	VOLTAGE	OUTPUT
	26	UNUSED	DIGITAL	OUTPUT
	27	CAN LOW	COMM	I/O
	28	CAN HIGH	COMM	I/O
	29	UNUSED	DIGITAL	INPUT
	30	UNUSED	ANALOG	INPUT
	31	UNUSED	DIGITAL	INPUT
	32	UNUSED	DIGITAL	INPUT
	33	UNUSED	DIGITAL	OUTPUT
	34	UNUSED	DIGITAL	OUTPUT
	35	UNUSED	DIGITAL	INPUT

Connector	Pin	Function	Type	
-B	1	MODULE GROUND	GROUND	INPUT

Connector	Pin	Function	Type	
+B	1	MODULE GROUND	VBAT	INPUT

Connector	Pin	Function	Type	
U	1	MOTOR PHASE U	AC	OUTPUT

Connector	Pin	Function	Type	
V	1	MOTOR PHASE V	AC	OUTPUT

Connector	Pin	Function	Type	
W	1	MOTOR PHASE W	AC	OUTPUT

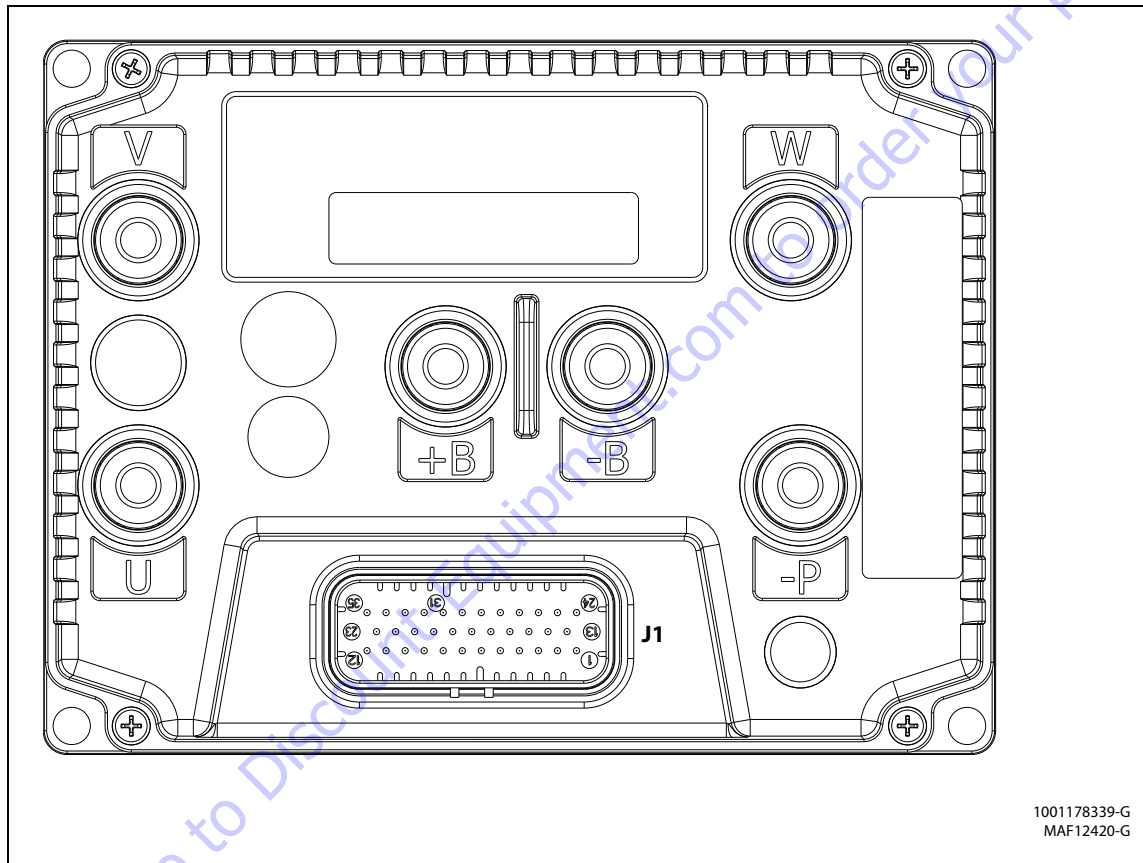


Figure 6-11. Power Module - RH

Connector	Pin	Function	Type	
J1	1	UNUSED	DIGITAL	INPUT
	2	ELECTRO BRAKE	DIGITAL	OUTPUT
	3	ELECTRO BRAKE SUPPLY (POS)	VBAT	INPUT
	4	ELECTRO BRAKE DRIVER (NEG)	PWM	OUTPUT
	5	WHEEL ENCODER GROUND	GROUND	INPUT
	6	MODULE ADDRESS	DIGITAL	INPUT
	7	UNUSED	DIGITAL	INPUT
	8	UNUSED	DIGITAL	OUTPUT
	9	UNUSED	DIGITAL	OUTPUT
	10	KEY SWITCH (IGNITION)	DIGITAL	INPUT
	11	UNUSED	DIGITAL	OUTPUT
	12	CONTACTOR DRIVER (MASTER)	PWM	OUTPUT
	13	WHEEL ENCODER PIN B	DIGITAL	INPUT
	14	WHEEL ENCODER PIN A	DIGITAL	INPUT
	15	STEERING ANGLE (MASTER)	ANALOG	INPUT
	16	CHARGER INTERLOCK (MASTER)	DIGITAL	INPUT
	17	UNUSED	DIGITAL	INPUT
	18	UNUSED	DIGITAL	INPUT
	19	UNUSED	DIGITAL	INPUT
	20	UNUSED	DIGITAL	INPUT
	21	UNUSED	DIGITAL	INPUT
	22	MOTOR THERMAL SENSOR	ANALOG	INPUT
	23	UNUSED	PWM	OUTPUT
	24	UNUSED	PWM	OUTPUT
	25	WHEEL ENCODER POWER (+5 VOLTS)	VOLTAGE	OUTPUT
	26	UNUSED	DIGITAL	OUTPUT
	27	CAN LOW	COMM	I/O
	28	CAN HIGH	COMM	I/O
	29	UNUSED	DIGITAL	INPUT
	30	UNUSED	ANALOG	INPUT
	31	UNUSED	DIGITAL	INPUT
	32	UNUSED	DIGITAL	INPUT
	33	UNUSED	DIGITAL	OUTPUT
	34	UNUSED	DIGITAL	OUTPUT
	35	UNUSED	DIGITAL	INPUT

Connector	Pin	Function	Type	
-B	1	MODULE GROUND	GROUND	INPUT

Connector	Pin	Function	Type	
+B	1	MODULE POWER	VBAT	INPUT

Connector	Pin	Function	Type	
-P	1	PUMP	PWM	OUTPUT

Connector	Pin	Function	Type	
U	1	MOTOR PHASE U	AC	OUTPUT

Connector	Pin	Function	Type	
V	1	MOTOR PHASE V	AC	OUTPUT

Connector	Pin	Function	Type	
W	1	MOTOR PHASE W	AC	OUTPUT

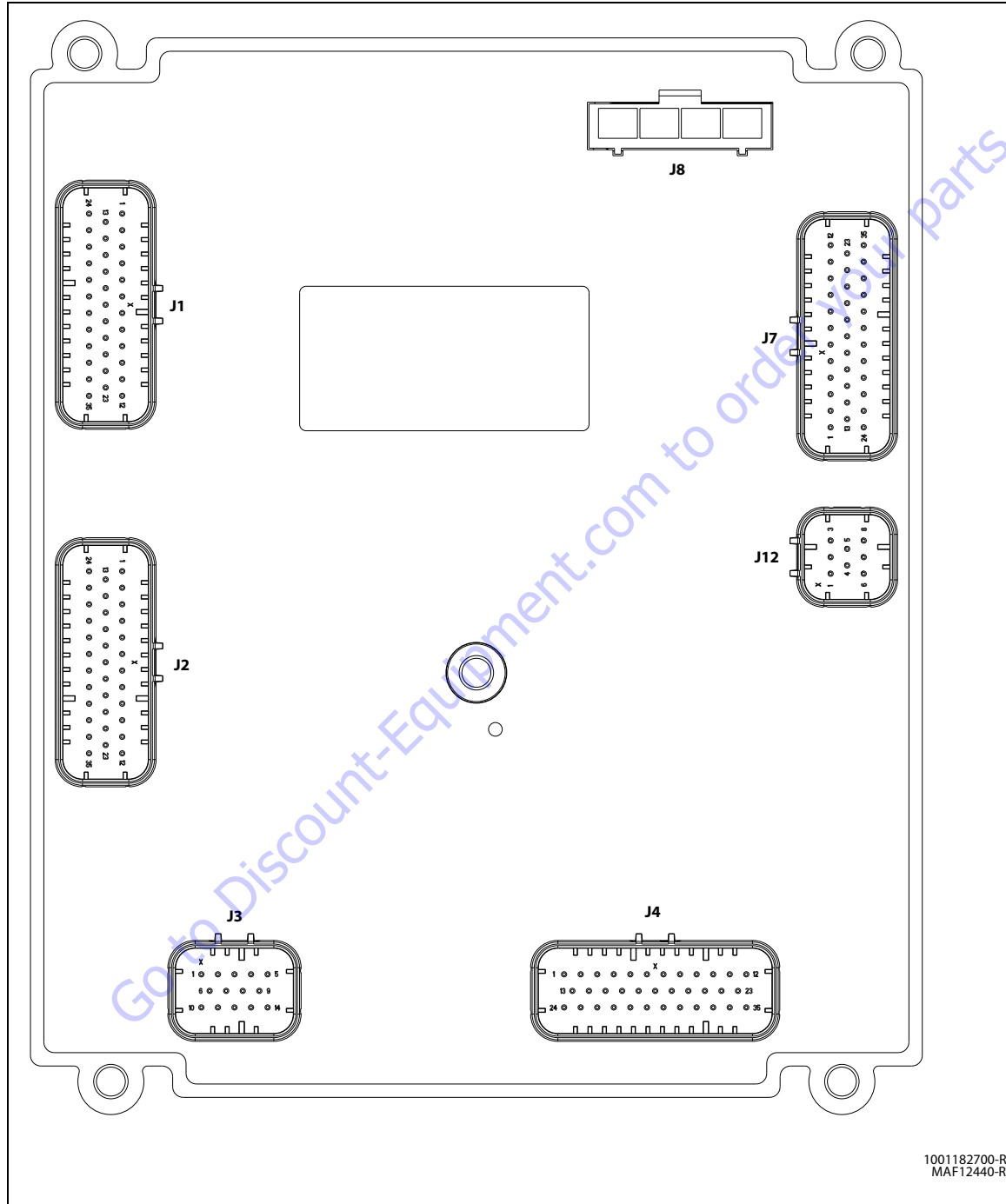


Figure 6-12. Ground Control Module

Connector	Pin	Function	Type	
<b>J1</b> <b>(Natural)</b>	1	UNUSED	DIGITAL	OUTPUT
	2	ALERT BEACON POWER	DIGITAL	OUTPUT
	3	UNUSED	DIGITAL	OUTPUT
	4	ALERT BEACON GROUND	GROUND	INPUT
	5	UNUSED	GROUND	INPUT
	6	UNUSED	DIGITAL	OUTPUT
	7	UNUSED	DIGITAL	OUTPUT
	8	UNUSED (GROUND)	GROUND	INPUT
	9	UNUSED (GROUND)	GROUND	INPUT
	10	UNUSED	DIGITAL	OUTPUT
	11	UNUSED	DIGITAL	OUTPUT
	12	UNUSED	DIGITAL	OUTPUT
	13	DRIVE ENABLE RELAY	DIGITAL	OUTPUT
	14	UNUSED	ANALOG	INPUT
	15	UNUSED	ANALOG	INPUT
	16	UNUSED	FREQUENCY	INPUT
	17	UNUSED	GROUND	INPUT
	18	UNUSED	GROUND	INPUT
	19	DRIVE ENABLE RELAY GROUND	GROUND	INPUT
	20	UNUSED	DIGITAL	OUTPUT
	21	UNUSED	DIGITAL	INPUT
	22	UNUSED	DIGITAL	OUTPUT
	23	UNUSED	DIGITAL	OUTPUT
	24	UNUSED	N/C	N/C
	25	UNUSED (RESERVED FOR RS-485 HIGH)	SERIAL	I/O
	26	UNUSED (RESERVED FOR RS-485 LOW)	SERIAL	I/O
	27	UNUSED (GROUND)	GROUND	INPUT
	28	ANALYZER POWER	VOLTAGE	OUTPUT
	29	ANALYZER RS-232 RX	SERIAL	INPUT
	30	ANALYZER RS-232 TX	SERIAL	OUTPUT
	31	ANALYZER GROUND	GROUND	INPUT
	32	UNUSED	DIGITAL	OUTPUT
	33	UNUSED (GROUND)	GROUND	INPUT
	34	UNUSED	DIGITAL	INPUT
	35	UNUSED	DIGITAL	INPUT

Connector	Pin	Function	Type	
<b>J2</b> <b>(Gray)</b>	1	LIFT BYPASS SOLENOID	DIGITAL	OUTPUT
	2	UNUSED	DIGITAL	OUTPUT
	3	TELESCOPE IN SOLENOID	DIGITAL	OUTPUT
	4	JIB RIGHT SOLENOID	DIGITAL	OUTPUT
	5	PLATFORM LEVEL UP SOLENOID / AWD RIGHT FORWARD	DIGITAL	OUTPUT
	6	LIFT BYPASS SOLENOID GROUND	GROUND	INPUT
	7	PLATFORM LEVEL DOWN SOLENOID / AWD RIGHT REVERSE	DIGITAL	OUTPUT
	8	STEER FLOW CONTROL SOLENOID	DIGITAL	OUTPUT
	9	TOWER LIFT DOWN SOLENOID	DIGITAL	OUTPUT
	10	PLATFORM ROTATE LEFT SOLENOID / AWD LEFT FORWARD	DIGITAL	OUTPUT
	11	MAIN LIFT UP SOLENOID	DIGITAL	OUTPUT
	12	JIB UP SOLENOID	DIGITAL	OUTPUT
	13	UNUSED	DIGITAL	OUTPUT
	14	PLATFORM/JIB ROTATE SOLENOID GROUND / AWD SOLENOID GROUND	GROUND	INPUT
	15	TELESCOPE OUT SOLENOID	DIGITAL	OUTPUT
	16	SIDESWING LEFT SOLENOID	DIGITAL	OUTPUT
	17	TELESCOPE SOLENOID GROUND	GROUND	INPUT
	18	SWING ARREST SOLENOID GROUND / OSC AXLE CHARGE SOL GROUND	GROUND	INPUT
	19	SWING ARREST SOLENOID / OSC AXLE CHARGE SOLENOID	DIGITAL	OUTPUT
	20	TOWER LIFT UP SOLENOID	DIGITAL	OUTPUT
	21	PLATFORM ROTATE RIGHT SOLENOID / AWD LEFT REVERSE	DIGITAL	OUTPUT
	22	LIFT DOWN SOLENOID	DIGITAL	OUTPUT
	23	JIB DOWN SOLENOID	DIGITAL	OUTPUT
	24	OSC AXLE SWITCH	DIGITAL	INPUT
	25	UNUSED	ANALOG	INPUT
	26	HEAD / TAIL LIGHT ENABLE RELAY	DIGITAL	OUTPUT
	27	GROUND ALARM OUTPUT	DIGITAL	OUTPUT
	28	STEER SOLENOID GROUND	GROUND	INPUT
	29	GROUND ALARM GROUND	GROUND	INPUT
	30	OSC AXLE SW GROUND	GROUND	INPUT
	31	FLOW CONTROL SOLENOID	DIGITAL	OUTPUT
	32	STEER RIGHT SOLENOID	DIGITAL	OUTPUT
	33	STEER LEFT SOLENOID	DIGITAL	OUTPUT
	34	SWING LEFT SOLENOID	DIGITAL	OUTPUT
	35	SWING RIGHT SOLENOID	DIGITAL	OUTPUT



**SECTION 6 - JLG CONTROL SYSTEM**

Connector	Pin	Function	Type	
<b>J3 (Black)</b>	1	STEER FLOW CONTROL CURRENT FEEDBACK (LSD CURRENT SENSE 1)	GROUND	INPUT
	2	MAIN LIFT CURRENT FEEDBACK (LSD CURRENT SENSE 2)	GROUND	INPUT
	3	UNUSED (GROUND)	GROUND	INPUT
	4	SWING CURRENT FEEDBACK (LSD CURRENT SENSE 4)	GROUND	INPUT
	5	TOWER LIFT CURRENT FEEDBACK (LSD CURRENT SENSE 5)	GROUND	INPUT
	6	FLOW CONTROL VALVE CURRENT FEEDBACK (LSD CURRENT SENSE 6)	GROUND	INPUT
	7	BATTERY VOLTAGE FOR GROUND ALARM	VBAT	OUTPUT
	8	UNUSED	DIGITAL	INPUT
	9	UNUSED	DIGITAL	INPUT
	10	UNUSED	DIGITAL	INPUT
	11	UNUSED	DIGITAL	INPUT
	12	UNUSED (+5 VOLTS)	VOLTAGE	OUTPUT
	13	UNUSED	ANALOG	INPUT
	14	UNUSED (LSD CURRENT SENSE 3)	GROUND	INPUT

Connector	Pin	Function	Type	
<b>J8 (Black)</b>	1	MODULE GROUND / GROUND FROM BATTERY	GROUND	OUTPUT
	2	MODULE POWER / GROUND EMS	VBAT	INPUT
	3	GROUND TO PLATFORM MODULE	GROUND	INPUT
	4	POWER TO PLATFORM MODULE / GROUND EMS OUT TO PLATFORM	VBAT	OUTPUT

Connector	Pin	Function	Type	
<b>J12 (Blue)</b>	1	UNUSED	FREQUENCY	INPUT
	2	UNUSED	FREQUENCY	INPUT
	3	CAN2 HIGH	SERIAL	I/O
	4	CAN2 LOW	SERIAL	I/O
	5	CAN2 SHIELD	GROUND	INPUT
	6	UNUSED	TERM	I/O
	7	UNUSED	TERM	I/O
	8	MSSO	DIGITAL	INPUT


Connector	Pin	Function	Type	
<b>J4 (Blue)</b>	1	UNUSED	DIGITAL	OUTPUT
	2	UNUSED	DIGITAL	OUTPUT
	3	UNUSED	DIGITAL	OUTPUT
	4	UNUSED	DIGITAL	INPUT
	5	PLATFORM LEVEL DOWN	DIGITAL	INPUT
	6	PLATFORM ROTATE LEFT	DIGITAL	INPUT
	7	MAIN TELESCOPE IN	DIGITAL	INPUT
	8	JIB DOWN	DIGITAL	INPUT
	9	JIB LEFT	DIGITAL	INPUT
	10	TOWER LIFT UP	DIGITAL	INPUT
	11	UNUSED	DIGITAL	INPUT
	12	UNUSED	DIGITAL	OUTPUT
	13	UNUSED	DIGITAL	OUTPUT
	14	PLATFORM OVERLOADED INDICATOR	DIGITAL	OUTPUT
	15	UNUSED	DIGITAL	OUTPUT
	16	AUXILIARY POWER / FUNCTION ENABLE	DIGITAL	INPUT
	17	PLATFORM LEVEL UP	DIGITAL	INPUT
	18	PLATFORM ROTATE RIGHT	DIGITAL	INPUT
	19	JIB UP	DIGITAL	INPUT
	20	JIB RIGHT	DIGITAL	INPUT
	21	TOWER LIFT DOWN	DIGITAL	INPUT
	22	UNUSED	DIGITAL	INPUT
	23	MAIN LIFT UP	DIGITAL	INPUT
	24	BATTERY VOLTAGE FOR MDI	VBAT	OUTPUT
	25	BATTERY VOLTAGE FOR SWITCHES	VBAT	OUTPUT
	26	UNUSED	DIGITAL	OUTPUT
	27	UNUSED	DIGITAL	OUTPUT
	28	UNUSED	DIGITAL	OUTPUT
	29	UNUSED	DIGITAL	OUTPUT
	30	TELESCOPE OUT	DIGITAL	INPUT
	31	LAMP GROUND	GROUND	INPUT
	32	MDI GROUND	GROUND	INPUT
	33	MAIN LIFT DOWN	DIGITAL	INPUT
	34	SWING LEFT	DIGITAL	INPUT
	35	SWING RIGHT	DIGITAL	INPUT


Connector	Pin	Function	Type	
<b>J7 (Black)</b>	1	PLATFORM EMS	DIGITAL	INPUT
	2	PLATFORM MODE	DIGITAL	INPUT
	3	GROUND MODE	DIGITAL	INPUT
	4	UPPER BOOM ELEVATION SWITCH	ANALOG	INPUT
	5	UNUSED	VOLTAGE	OUTPUT
	6	CAN1 TERMINATOR	TERM	I/O
	7	LOWER BOOM ELEVATION SWITCH	ANALOG	INPUT
	8	UNUSED	ANALOG	INPUT
	9	UNUSED (GROUND)	GROUND	INPUT
	10	UNUSED (GROUND)	GROUND	INPUT
	11	DOS SWITCH	DIGITAL	INPUT
	12	UNUSED	DIGITAL	INPUT
	13	CAN1 HIGH	SERIAL	I/O
	14	GROUND MODE POWER TO PLATFORM	DIGITAL	INPUT
	15	FOOTSWITCH	DIGITAL	INPUT
	16	UNUSED (+5 VOLTS)	VOLTAGE	OUTPUT
	17	CAN1 TERMINATOR	TERM	I/O
	18	CAN1 SHIELD	GROUND	INPUT
	19	UNUSED (GROUND)	GROUND	INPUT
	20	UNUSED	ANALOG	INPUT
	21	UNUSED	DIGITAL	INPUT
	22	UNUSED	DIGITAL	INPUT
	23	UNUSED	DIGITAL	INPUT
	24	CAN1 LOW	SERIAL	I/O
	25	TILT SENSOR GROUND	GROUND	INPUT
	26	UNUSED (+5 VOLTS)	VOLTAGE	OUTPUT
	27	UNUSED (+5 VOLTS)	VOLTAGE	OUTPUT
	28	UNUSED	GROUND	INPUT
	29	BATTERY VOLTAGE FOR TILT SENSOR	VBAT	OUTPUT
	30	BATTERY VOLTAGE FOR BOOM LIMIT SWITCH	VBAT	OUTPUT
	31	UNUSED	VBAT	OUTPUT
	32	UNUSED	VBAT	OUTPUT
	33	UNUSED	VBAT	OUTPUT
	34	UNUSED	VBAT	OUTPUT
	35	UNUSED	DIGITAL	INPUT



### Analyzer Diagnostics Menu Structure

In the following structure descriptions, an intended item is

selected by pressing **ENTER** ; pressing **ESCAPE** 

steps back to the next outer level. The **LEFT**  or **RIGHT**

 arrow keys move between items in the same level. The

**UP**  or **DOWN**  arrow keys alter a value if allowed.

**Table 6-7. DIAGNOSTICS - Menu Descriptions**

Diagnosics Submenu (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter Value (Displayed on Analyzer 2 <sup>nd</sup> Line)	Description
DRIVE/STEER [Platform Mode =True]	DRIVE DEMAND	FORWARD/REVERSE XXX%	Direction and calibrated Control System Command percentage
	DRIVE OUTPUT	FORWARD/REVERSE XXX%	UGM direction and output speed command
	DRIVE MODE	MAX SPEED/REDUCED SPEED	Drive Mode status
	STEER DEMAND	LEFT/RIGHT XXX%	Direction and percentage of input command from Drive/Steer Joystick
	STEER OUTPUT	LEFT/RIGHT XXX%	UGM directional valve output status
	STEER PRTY VLV	XXX%	Steer priority bypass valve
	STEER SENSOR	VOLTAGE XX.XXV	Steer sensor raw voltage reported by MTM
	STEER SENSOR	ANGLE XX.XDEG	Steer sensor angle reported by MTM
	DRV ORIENT MODE	INLINE/SWUNG	State of DOS switch (prox energized when in line to close normally open contacts)
	DRV ORIENT STATE	CONFIRMED/REQUIRED	InLine and DOS Active = Confirmed
	DRV ORNT OVR SW	CLOSED/OPEN	State of Drive Orientation Override Switch
BOOM FUNCTIONS	SWING DEMAND	LEFT/RIGHT XXX%	Direction and percentage of input command from Swing Joystick or Ground%
	SWING OUTPUT	LEFT/RIGHT XXX%	Direction and valve PWM output percentage
	SWING ASSIST	ON/OFF	Status of swing restriction bypass valve
	LIFT DEMAND	UP/DOWNXXX%	Direction and percentage of input command from Function Speed Pot or Ground%
	LIFT OUTPUT	UP/DOWN XXX%	Direction and valve PWM output percentage
	TELE DEMAND	IN/OUT XXX%/CREEP	Direction and percentage of input command (or CREEP if applicable) from Function Speed Pot or Ground%
	TELE OUTPUT	IN/OUT/OFF	Direction/state of Tele directional valve
	JIB LIFT DEMAND	UP/DOWN XXX%/CREEP	Direction and percentage of input command (or CREEP if applicable) from Function Speed Pot or Ground% [Machine SetUP -> JIB -> YES]
	JIB LIFT OUTPUT	UP/OFF/DOWN XXX%	Direction for Up, but % command for Down [Machine SetUP -> JIB -> YES]
	JIB SWING DEMAND	LEFT/RIGHT XXX%/CREEP	Direction and percentage of input command (or CREEP if applicable) from Function Speed Pot or Ground% [Machine SetUP -> JIB SWING -> YES]
	JIB SWING OUTPUT	LEFT/RIGHT XXX%	Direction for Left, but % command for Right [Machine SetUP -> JIB SWING -> YES]

Table 6-7. DIAGNOSTICS - Menu Descriptions

Diagnosics Submenu (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter Value (Displayed on Analyzer 2 <sup>nd</sup> Line)	Description
	PLAT LVL DEMAND	UP/DOWN XXX%/CREEP	Direction and percentage of input command (or CREEP if applicable) from Function Speed Pot or Ground%
	PLAT LVL OUTPUT	UP/DOWN XXX%	Direction/state of Level directional valve
	PLAT ROT DEMAND	LEFT/RIGHT XXX%/CREEP	Direction and percentage of input command (or CREEP if applicable) from Function Speed Pot or Ground%
	PLAT ROT OUTPUT	LEFT/RIGHT XXX%	Direction/state of Rotate directional valve
	PUMP SPEED CMD	XXX%	UGM pump command value: 0-100%
	PUMP SPEED FDBK	XXX%	Pump PWM reported from MTM
	PUMP CURRENT	FDBK: XXXA	Pump current reported from MTM
	PUMP ENABLE	ON/OFF	UGM pump enable bit status
	PUMP OP MODE	OFF/RUNNING	Pump status from MTM
	FUNCTION SPEED [Platform Mode = True]	SETTING: XXX%	Displays the percentage demand from the Function Speed Potentiometer.
	CREEP SW [Platform Mode = True]	OPEN/CLOSED	Status of Creep Switch Input
	CREEP MODE	ON/OFF	Displays status of Creep Mode
	FLOW CONTRL VLV	XXX%	Duty cycle of flow control proportional valve
SYSTEM	MAIN CONTACTOR	ENABLED/DISABLED	Status of Main Contactor reported by Zapi module
	MAIN CONT VOTE	ENABLED/DISABLED	Status of Main Contactor voting relay by UGM
	CHASSIS TILT	XX.XDEG	Combined X/Y Absolute Angle
	CHASSIS TILT	X-AXIS: XX.XDEG	X Angle with respect to sign
	CHASSIS TILT	Y-AXIS: XX.XDEG	Y Angle with respect to sign
	UGM AMBIENT TEMP	XXXC/XXXF	Ambient Temperature Sensor Reading from on-board UGM Sensor
	LOW AMBIENT TEMP	XXXC/XXXF	Low Temp Cutout Sensor Ambient Temperature sensor Reading [MACHINE SETUP ' TEMP CUTOUT = YES
	LOW TEMPERATURE	CUTOUT: ACTIVE/INACTIVE/FAULTY	Status of Low Temperature Cutout; Only displayed if MACHINE SETUP → TEMP CUTOUT = YES
	MSSO	ACTIVE/INACTIVE	Status of MSSO [MACHINE SETUP'MARKET=CE and Operating Mode=Ground]

## SECTION 6 - JLG CONTROL SYSTEM

**Table 6-7. DIAGNOSTICS - Menu Descriptions**

Diagnosics Submenu (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter Value (Displayed on Analyzer 2 <sup>nd</sup> Line)	Description	
SYSTEM INPUTS	OSC AXLE PRESS SW	CLOSED/OPEN	Closed for High Pressure	
	OSC AXLE PRESS	HIGH/LOW	Pressure high if input = high	
	BOOM ELEV SW	OPEN/CLOSED	State of Boom Elevation Switch #1	
	ELEVATION MODE	ABOVE/NOT ABOVE	Elevation State	
	TRANSPORT MODE	IN TRANSPORT/OUT OF TRANSPORT	Transport Position	
	CREEP SW	OPEN/CLOSED	Status of Creep Switch Input	
	CREEP MODE	ON/OFF	Displays status of Creep Mode	
	GROUND SELECT	KEYSWITCH: OPEN		Displays whether Ground Keyswitch position is being selected
		KEYSWITCH: CLOSED		
	PLATFORM SELECT	KEYSWITCH: OPEN		Displays whether Platform Keyswitch position is being selected
		KEYSWITCH: CLOSED		
	STATION CONTROL	GROUND/PLATFORM	Displays Active control station per System Mode definition	
	FOOTSWITCH INPUT	GROUND: OPEN		State of Footswitch input at UGM (Open with Footswitch is not activated).
		GROUND: CLOSED		
FOOTSWITCH INPUT	PLATFORM: CLOSED		State of Footswitch input at PM (Closed when footswitch not activated).	
	PLATFORM: OPEN			
TRACTION	RIGHT MOTOR	FREQ XXX.X Hz	Motor drive frequency reported by associated PM	
	LEFT MOTOR	FREQ XXX.X Hz	Motor drive frequency reported by associated PM	
	RIGHT MOTOR	SPEED XXX RPM	Motor encoder speed reported by associated PM	
	LEFT MOTOR	SPEED XXX RPM	Motor encoder speed reported by associated PM	
	RIGHT MOTOR	OFF/REGEN/DRIVE/MOTOR BRAKE/ PARKING BRAKE	Traction mode status as reported by associated PM	
	LEFT MOTOR	OFF/REGEN/DRIVE/MOTOR BRAKE/ PARKING BRAKE	Traction mode status as reported by associated PM	
	RIGHT MOTOR	CURRENT XXXA	ACrms Motor current reported by associated PM; display in Platform Mode only	
	LEFT MOTOR	CURRENT XXXA	ACrms Motor current reported by associated PM; display in Platform Mode only	
	RIGHT MOTOR	TEMP XXXC/F	Module temperature reported by PM; display in Platform Mode only	
	LEFT MOTOR	TEMP XXXC/F	Module temperature reported by PM; display in Platform Mode only	
	RIGHT BRAKE	APPLIED/RELEASED	Brake status reported by associated PM	
	LEFT BRAKE	APPLIED/RELEASED	Brake status reported by associated PM	
	RIGHT MODULE	TEMP XXXC/F	Module temperature reported by PM; display in Platform Mode only	
	LEFT MODULE	TEMP XXXC/F	Module temperature reported by PM; display in Platform Mode only	

Table 6-7. DIAGNOSTICS - Menu Descriptions

Diagnosics Submenu (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter Value (Displayed on Analyzer 2 <sup>nd</sup> Line)	Description
VOLTAGE/CUR	BATTERY SOC	XXX%/DISCHARGED/DEEP DISCHARGED	UGM calculated battery State-of-Charge; display percentage unless Discharged or Deeply Discharged
	BATTERY VOLTAGE	XX.XXV	UGM computed Vbat from MTM with compensation for voltage drop
	BATTERY CURRENT	XXXA	
	RIGHT SYSTEM	VOLTAGE XX.XXV	Real time system voltage reported by associated PM and compensated by UGM; not SOC
	LEFT SYSTEM	VOLTAGE XX.XXV	Real time system voltage reported by associated PM and compensated by UGM; not SOC
	UGM CONTROL	VOLTAGE XX.XV	UGM measured system control voltage
	PLATFORM MODULE	VOLTAGE XX.XV	Platform Module reported battery voltage measurement
	AC CHARGER	CONNECTED/NOT CONNECTED	Reflect status of charger connectivity reported by MTM
OPER CONTROLS	JOYSTICK DRIVE	FORWARD/REVERSE XXX%	Drive Joystick drive direction and command percentage as reported from PM [Platform Mode = TRUE]
	JOYSTICK STEER	LEFT/RIGHT XXX%	Drive Joystick steer direction and percentage command as reported from PM [Platform Mode = TRUE]
	JOYSTICK SWING	LEFT/RIGHT XXX%	Lift/Swing Joystick Swing direction and percentage command as reported from PM [Platform Mode = TRUE]
	JOYSTICK LIFT	UP/DOWN XXX%	Lift/Swing Joystick Lift direction and percentage command as reported from PM [Platform Mode = TRUE]
	DRV ORNT OVR SW	CLOSED/OPEN	State of Drive Orientation Override Switch [Platform Mode = TRUE]
	ENABLE	OPEN/CLOSED	Status of FUNCTION ENABLE Toggle Switch Input [Ground Mode = TRUE]
	SWING LEFT SW	OPEN/CLOSED	Status of Ground Toggle Switch Input [Ground Mode = TRUE]
	SWING RIGHT SW	OPEN/CLOSED	Status of Ground Toggle Switch Input [Ground Mode = TRUE]
	LIFT UP SW	OPEN/CLOSED	Status of Ground Toggle Switch Input [Ground Mode = TRUE]
	LIFT DN SW	OPEN/CLOSED	Status of Ground Toggle Switch Input [Ground Mode = TRUE]
	TELE IN SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	TELE OUT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	JIB LIFT UP SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input [MACHINE SETUP ' Jib = YES]
	JIB LIFT DN SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input [MACHINE SETUP ' Jib = YES]

**Table 6-7. DIAGNOSTICS - Menu Descriptions**

<b>Diagnostics Submenu (Displayed on Analyzer 1<sup>st</sup> Line)</b>	<b>Parameter (Displayed on Analyzer 1<sup>st</sup> Line)</b>	<b>Parameter Value (Displayed on Analyzer 2<sup>nd</sup> Line)</b>	<b>Description</b>
	JIB SWING LT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input [MACHINE SETUP ' Jib Swing = YES]
	JIB SWING RT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input [MACHINE SETUP ' Jib Swing = YES]
	PLAT LEVEL UP SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	PLAT LEVEL DN SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	PLAT ROT LEFT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	PLAT ROT RIGHT SW	OPEN/CLOSED	Status of Ground/Platform Toggle Switch Input
	MAX SPEED SW	OPEN/CLOSED	Status of Platform Toggle Switch Input [Platform Mode = TRUE]
	CREEP SW	OPEN/CLOSED	Status of Creep Switch Input [Platform Mode = TRUE]
	HORN SW	OPEN/CLOSED	Status of Platform Switch Input [Platform Mode = TRUE]
	SG OVERRIDE SW	OPEN/CLOSED	Status of Platform SkyGuard Override Switch Input if MACHINE SETUP → SKYGUARD = YES
	MSSO SW	OPEN/CLOSED	Status of MSSO switch; [MACHINE SETUP'MARKET=CE and Ground mode = TRUE]
	AWDA ENABLE	OPEN/CLOSED	Status of AWDA Enable
OPTIONS	H&T LIGHTS SW	OPEN/CLOSED	Status of Platform Toggle Switch Input [Platform Mode = TRUE and MACHINE SETUP ' H&T LIGHTS = YES]
	H&T LIGHTS OUT	ON/OFF	UGM Nite Brite Relay Enable output [Platform Mode = TRUE and MACHINE SETUP ' H&T LIGHTS = YES]
	SKYGUARD INPUTS	OPEN/CLOSED/DISAGREE	SkyGuard Input #1 (PLT J7-18) AND SkyGuard Input #2 (PLT J1-23) state [Platform Mode = TRUE and MACHINE SETUP ' SKYGUARD ? NO]
	SKYGUARD INPUT 1	OPEN/CLOSED	State of SkyGuard Platform Input #1 (J7-18); relay NC contacts - closed when active [Platform Mode = true and MACHINE SETUP ' SKYGUARD ? NO]
	SKYGUARD INPUT 2	OPEN/CLOSED	State of SkyGuard Platform Input #2 (J1-23); relay NC contacts - closed when active [Platform Mode= TRUE and MACHINE SETUP ' SKYGUARD ? NO]
	SOFTTOUCH INPUT	OPEN/CLOSED	State of softtouch input (Platform input J1-20) [MACHINE SETUP ' SOFTTOUCH = YES]

Table 6-7. DIAGNOSTICS - Menu Descriptions

Diagnosics Submenu (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter Value (Displayed on Analyzer 2 <sup>nd</sup> Line)	Description
CAN STATISTICS	CAN 1 STATISTICS	RX/SEC: XXX	
	CAN 1 STATISTICS	TX/SEC: XXX	
	CAN 1 STATISTICS	BUS OFF: XXX	
	CAN 1 STATISTICS	PASSIVE: XXX	
	CAN 1 STATISTICS	MSG ERROR: XXXX	
	CAN 2 STATISTICS	RX/SEC: XXX	
	CAN 2 STATISTICS	TX/SEC: XXX	
	CAN 2 STATISTICS	BUS OFF: XXX	
	CAN 2 STATISTICS	PASSIVE: XXX	
	CAN 2 STATISTICS	MSG ERROR: XXXX	



## System Self Test

The system self test is utilized to locate typical problems. See Table 6-8, System Test Descriptions and Table 6-9, System Test Messages for information concerning the tests performed and available messages in this mode.

1. When the key switch is in the platform position and the self test enabled, the self test function will test all valves, contactors, platform inputs, indicator lamps, and system alarms for various fault conditions.

When the key switch is in the ground position, the self test function will test all valves, the line contactor, ground control inputs, and the ground alarm output for various fault conditions.

2. In order to test the inputs on the machine, the controller will ask the service technician to perform various tasks at the appropriate operator control station. An example of this is "Close LLU Switch". The controller expects the

operator to close the lower lift up switch. When the controller sees that the lower lift up switch has been closed, it will move on to the next input, lower lift down LLD. If the switch is faulty or the wiring is faulty, the controller will not move on to the next input. The controller will continue to wait for the closure of the input. If the operator knows the switch is faulty and wants to continue the tests he must simply press the enter key on the analyzer to continue.

3. After the controller has conducted the tests from the chosen operator station, it will display "TESTS COMPLETE". This indicates that the controller has checked all inputs and outputs for that station.

**NOTICE**

**IN ORDER FOR THE MACHINE TO FUNCTION AFTER THE SELF TEST IS COMPLETE, POWER MUST BE RECYCLED USING THE EMS OR THE KEY SWITCH.**

**Table 6-8. System Test Descriptions**

<p>RUN SYSTEM TEST</p>	<p>ENTER starts system test                      Not available until tests are activated Displays messages while system test runs Some messages are prompts, requiring user intervention.                      ENTER can be pressed if a fault is found, to confirm that the fault has been noted and to continue the system test.                      NOTE: a flashing message is critical, and prevents the system test running</p>
<p>ACTIVATE                      YES:ENTER, NO:ESC</p>	<p>Not available once tests are activated                      ENTER activates system tests                      NOTE: cannot be done while controller is in use (footswitch closed) and for a short time afterwards</p>

Table 6-9. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
RUNNING		Initial display when system test is run while running certain "critical" checks are made.
	CHECK GROUND/ PLATFORM SELECT	The analyzer must be connected to the active control station to run the system test
	CHECK CAN WIRING	The system test cannot run unless the CAN Bus is operating properly
	BATTERY VOLTAGE TOO LOW	The system test cannot run with MTM-reported battery voltage below 39.5V (not UGM-compensated value)
	BATTERY VOLTAGE TOO HIGH	The system test cannot run with the MTM-reported battery voltage above 65V
	CHECK SPEED	Reported vehicle speed must = 0 Hz (or mph)
	HIGHTILT ANGLE	The vehicle is tilted > 3° or the tilt sensor is faulty
	OPEN FOOTSWITCH	In platform mode, the footswitch must be open at the start of the test.
	CLOSE FOOTSWITCH	In platform mode, the operator must close the footswitch when this message is displayed
	BAD FOOTSWITCH	The two footswitch signals are not changing together, probably because one is open circuit. Check footswitch and wiring.
	OPEN FOOTSWITCH	In platform mode, the operator must open the footswitch when this message is displayed.
	PLATFORM OVERLOADED	Load Sensing is configured and the ground module considers the platform to be overloaded
TESTING OUTPUTS?	CLOSE FOOTSWITCH	*Check for Footswitch closed
	OPEN FOOTSWITCH	*Wait for Footswitch to open
	PRESS AND HOLD FOOTSWITCH	*The operator must engage and hold the footswitch for the next batch of tests to be successful. This is due to the hardware high side driver cutout in the ground module
	OPEN FOOTSWITCH	*Wait for Footswitch to open the advance
	FLOW CTRL VALVE	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	STEER RIGHT	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	STEER LEFT	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	SWING LEFT	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	SWING RIGHT	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	LIFT UP	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	LIFT DOWN	SHORT TO BATTERY or OPEN-CIRCUIT; or SHORT TO GROUND (or advance test after short delay)
	TELESCOPE OUT	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	TELESCOPE IN	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	JIB UP	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	JIB DOWN	SHORT TO BATTERY or OPEN-CIRCUIT (or advance test after short delay)
	JIB LT VALVE	SHORT TO BATTERY or OPEN-CIRCUIT (or advance test after short delay)
	JIB RT VALVE	SHORT TO BATTERY or OPEN-CIRCUIT (or advance test after short delay)
	PLATFORM LT VALVE	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	PLATFORM RT VALVE	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	PLATFORM LEVEL UP	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	PLATFORM LEVEL DOWN	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay)
	AWD	Check for Short-to-Battery and Short-to-Ground; do not assess Open circuit (can be normal condition); applies to E600 only
	OSC AXLE POWER	Check for Short-to-Battery and Short-to-Ground; do not assess Open circuit (can be normal condition); applies to E600 only

Table 6-9. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
	HEAD/TAIL LIGHTS	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay); displayed if the head/tail light option is configured.
	VOTE RELAY	SHORT TO BATTERY or OPEN-CIRCUIT or SHORT TO GROUND (or advance test after short delay); displayed if the head/tail light option is configured.
CHECKING PLATFORM INPUTS?	DRIVE MAX SPEED	OPEN or CLOSED (advance after switch closed to open)
	DRIVE REDUCED SPEED	OPEN or CLOSED (advance after switch closed to open)
	CL PLATFORM UP	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM UP	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM DOWN	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM DOWN	OPEN or CLOSED (advanced test after switch toggles)
	LIFT JOYSTICK TO UP MAX	(wait for joystick to reach +100% then advance)
	LIFT JOYSTICK TO DOWN MAX	(wait for joystick to reach -100% then advance)
	SWING JOYSTICK TO LEFT MAX	(wait for joystick to reach -100% then advance)
	SWING JOYSTICK TO RIGHT MAX	(wait for joystick to reach +100% then advance)
	CREEP SWITCH CCW	OPEN or CLOSED (advanced test after switch toggles)
	CREEP SWITCH CW	OPEN or CLOSED (advanced test after switch toggles)
	FUNC SPD TO MAX	
	FUNC SPD TO MIN	
	CL HORN	OPEN or CLOSED (advanced test after switch toggles)
	OP HORN	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM LEFT	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM LEFT	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB UP	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB UP	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB DOWN	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB DOWN	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB LEFT	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB LEFT	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB RIGHT	OPEN or CLOSED (advanced test after switch toggles)
CL TELE IN	OPEN or CLOSED (advanced test after switch toggles)	

Table 6-9. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
	OP TELE IN	OPEN or CLOSED (advanced test after switch toggles)
	CL TELE OUT	OPEN or CLOSED (advanced test after switch toggles)
	OP TELE OUT	OPEN or CLOSED (advanced test after switch toggles)
	CL DRIVE ORIENT	OPEN or CLOSED (advanced test after switch toggles)
	OP DRIVE ORIENT	OPEN or CLOSED (advanced test after switch toggles)
	DRIVE JOYSTICK TO FORWARD MAX	(wait for joystick to reach +100% then advance)
	DRIVE JOYSTICK TO BACK MAX	(wait for joystick to reach -100% then advance)
	STEER TO LEFT MAX	OPEN or CLOSED (advanced test after switch toggles)
	STEER TO RIGHT MAX	OPEN or CLOSED (advanced test after switch toggles)
	CL HEADLIGHT SWITCH	OPEN or CLOSED (advanced test after switch toggles)
	OP HEADLIGHT SWITCH	OPEN or CLOSED (advanced test after switch toggles)
	CL SKYGUARD OVR	OPEN or CLOSED (advanced test after switch toggles); display on if MACHINE SETUP 'SKYGUARD = YES
	OP SKYGUARD OVR	OPEN or CLOSED (advanced test after switch toggles); display on if MACHINE SETUP 'SKYGUARD = YES
	ENGAGE SKYGUARD	SkyGuard bar pressed; SkyGuard inputs #1 and #2 must both change to low state for passing condition; display on if MACHINE SETUP 'SKYGUARD = YES
	RELEASE SKYGUARD	Both SkyGuard inputs must change to high; display on if MACHINE SETUP 'SKYGUARD = YES
	ENGAGE SOFTTOUCH	OPEN or CLOSED (advanced test after switch toggles); display on if MACHINE SETUP 'SOFTTOUCH = YES
	RELEASE SOFTTOUCH	OPEN or CLOSED (advanced test after switch toggles); display on if MACHINE SETUP 'SOFTTOUCH = YES
TEST GROUND INPUTS?	CL SWING RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	OP SWING RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	CL SWING LEFT	OPEN or CLOSED (advanced test after switch toggles)
	OP SWING LEFT	OPEN or CLOSED (advanced test after switch toggles)
	CL LIFT UP	OPEN or CLOSED (advanced test after switch toggles)
	OP LIFT UP	OPEN or CLOSED (advanced test after switch toggles)
	CL LIFT DOWN	OPEN or CLOSED (advanced test after switch toggles)
	OP LIFT DOWN	OPEN or CLOSED (advanced test after switch toggles)
	CL TELE OUT	OPEN or CLOSED (advanced test after switch toggles)
	OP TELE OUT	OPEN or CLOSED (advanced test after switch toggles)
	CL TELE IN	OPEN or CLOSED (advanced test after switch toggles)
	OP TELE IN	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB UP	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB UP	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB DOWN	OPEN or CLOSED (advanced test after switch toggles)

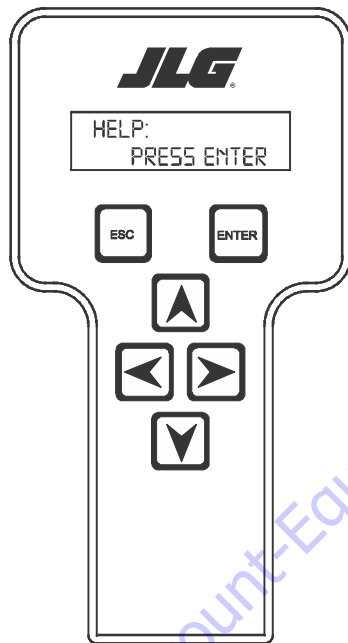
Table 6-9. System Test Messages

Message Displayed on Analyzer	Message Displayed on Analyzer	Description
	OP JIB DOWN	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB SWING LEFT	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB SWING LEFT	OPEN or CLOSED (advanced test after switch toggles)
	CL JIB SWING RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	OP JIB SWING RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM LEFT	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM LEFT	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM RIGHT	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM UP	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM UP	OPEN or CLOSED (advanced test after switch toggles)
	CL PLATFORM DOWN	OPEN or CLOSED (advanced test after switch toggles)
	OP PLATFORM DOWN	OPEN or CLOSED (advanced test after switch toggles)
	CL FUNC ENABLE	OPEN or CLOSED (advanced test after switch toggles)
	OP FUNC ENABLE	OPEN or CLOSED (advanced test after switch toggles)
	CL MSSO SWITCH	OPEN or CLOSED (advanced test after switch toggles); display only if MACHINE SETUP ' MARKET = CE
	OP MSSO SWITCH	OPEN or CLOSED (advanced test after switch toggles); display only if MACHINE SETUP ' MARKET = CE
TEST PLATFORM INDICATORS?	BAT FULL LAMP ON	
	BAT 3/4 LAMP ON	
	BAT 1/2 LAMP ON	
	BAT 1/4 LAMP ON	
	LOW BATTERY	
	ENABLE LAMP ON	
	CREEP LAMP ON	
	DISTRESS LAMP ON	
	TILT LAMP ON	
	OVERLOAD LAMP ON	Display only if LSS configured
	DRIVE ORIENTATION LAMP ON	
	SKYGUARD LAMP ON	Display on if SkyGuard configured
	SOFTTOUCH	Display if Soft Touch configured
	PLAT ALARM ON	
	HORN ON	
TEST GROUND INDICATORS?	OVERLOAD LAMP ON	Display only if MACHINE SETUP ' MARKET = CE
	ALERT BEACON	Display only if MACHINE SETUP -> ALERT BEACON = 20FPM FOR CREEP
TESTS COMPLETE		Indicates that the system test is complete. Any problems reported should have been noted and should now be rectified. Press ESC/CANCEL to return to the RUN SYSTEM TEST Analyzer menu.

## 6.5 CALIBRATING STEER

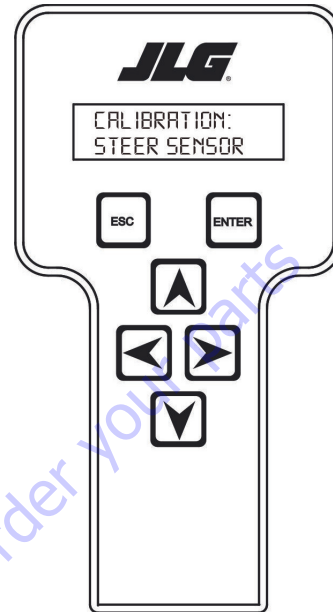
When calibrating steering, each individual wheel must be calibrated in order to make the tire and wheel parallel with the frame. Two methods to help ensure proper calibration are the use of a carpenter's square to square the spindle to the axle or aligning the two wheels on one side using a stretched string.

1. Position the Platform/Ground select switch to the Platform position.
2. Plug the analyzer into the connector at the base of the platform control box.
3. Pull out the Emergency Stop switch and Start the engine.
4. The analyzer screen should read:

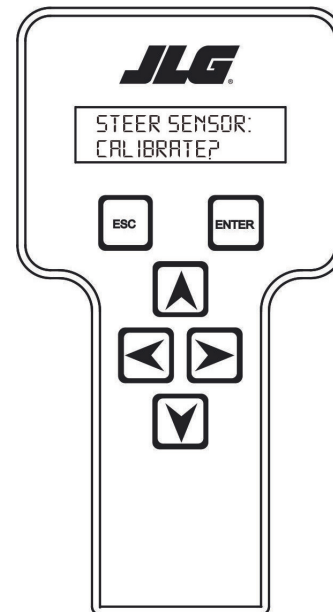


5. Use the arrow button to reach ACCESS LEVEL. Hit Enter.
6. Enter the Access Code, 33271.
7. Use the right Arrow key to reach CALIBRATIONS. Hit Enter.

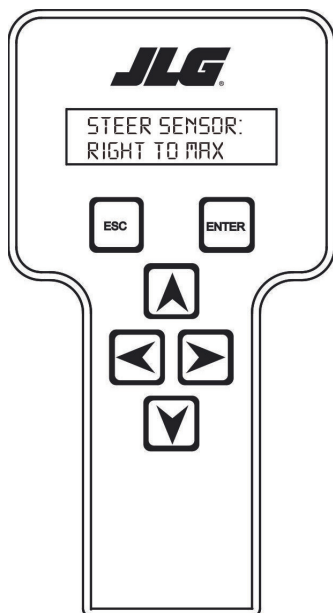
8. Use the arrow keys to reach STEER SENSOR. The screen will read:



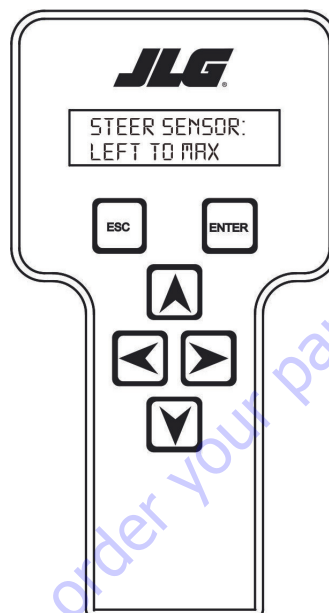
9. Hit Enter. The screen will read:



10. Hit Enter. The screen will read:



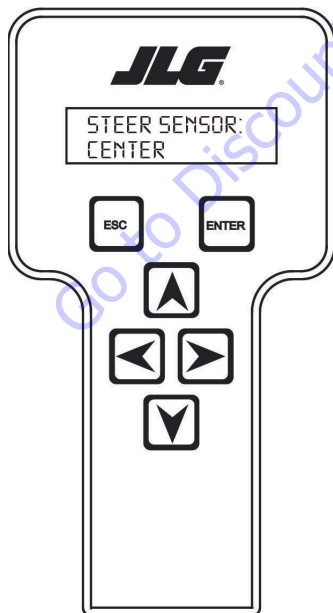
14. Hit Enter. The screen will read:



11. Activate the steer control until the tire and wheel are straight in relationship with the chassis, then leave off the control. The display will read Right Steer Maximum value.

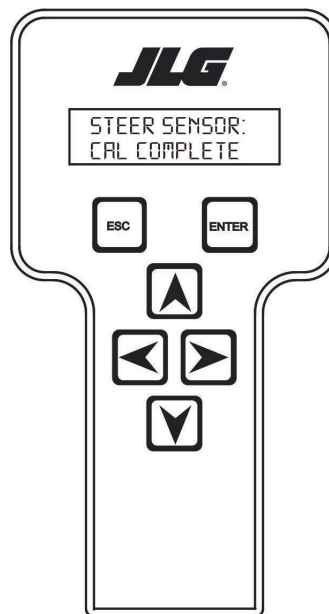
12. Hit Enter. The screen will read:

**NOTE:** It's important that the tires are pointed as straight as possible. This will allow Max Drive Speed, longer run times and reduced motor and controller heat.



15. The display will read Left Steer Maximum value.

16. Hit Enter. The screen will read:



17. After completing all the Steer Calibrations, hit ESC twice to go back to CALIBRATIONS.

13. The display will read steering Center position value.

## 6.6 CALIBRATING TILT SENSOR

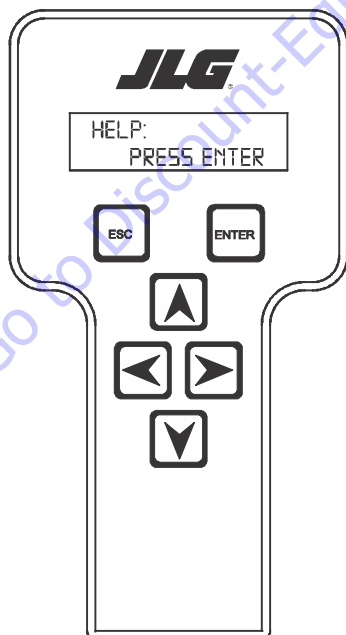
### NOTICE

A NEW TILT MODULE WILL ACT AS IF IT IS TILTED ALL OF THE TIME UNTIL THE FOLLOWING PROCEDURE IS PERFORMED.

### WARNING

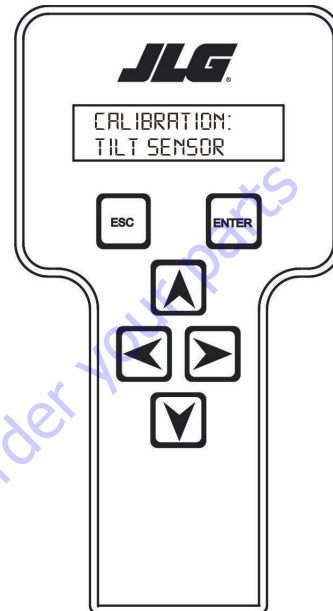
DO NOT CALIBRATE THE LEVEL SENSOR EXCEPT ON A LEVEL SURFACE.

1. Use the following procedure to calibrate the tilt sensor.
2. Before the tilt sensor can be calibrated, the following conditions must be met:
  - a. Steering previously calibrated.
  - b. Wheels straight.
  - c. Turntable centered.
  - d. Boom fully retracted.
  - e. Boom angle is less than 45°.
  - f. Machine on firm, level ground.
3. Position the Platform/Ground select switch to the Platform position.
4. Plug the analyzer into the connector inside the Ground control box.
5. Pull out the Emergency Stop switch and Start the engine.
6. The analyzer screen should read:

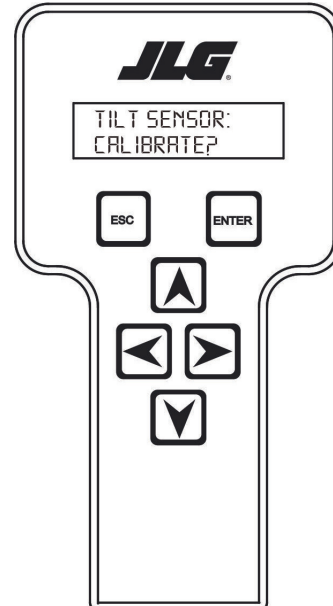


7. Use the arrow button to reach ACCESS LEVEL. Hit Enter.
8. Enter the Access Code, 33271.

9. Use the right Arrow key to reach CALIBRATIONS. Hit Enter.
10. Use the arrow keys to reach TILT SENSOR. The screen will read:

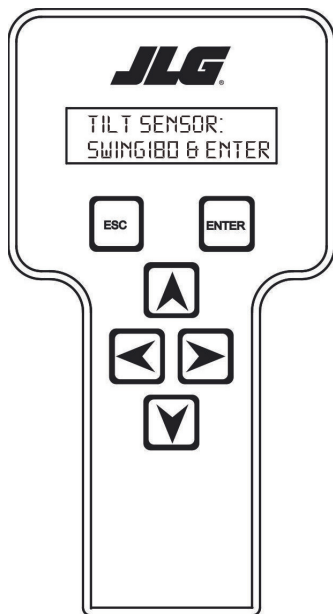


11. Hit Enter. The screen will read:

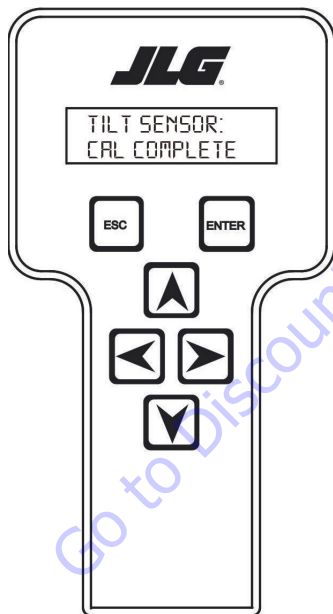




- When prompted, swing turntable 180° to opposite end of chassis.



- Hit Enter. The screen will read:

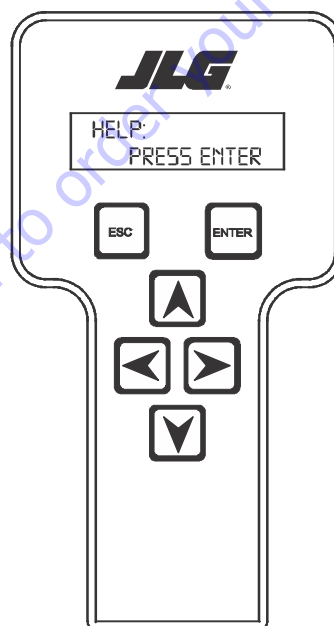


- Upon completing swing calibration, swing turntable 180° back to the stowed position.
- Hit ESC twice to go back to CALIBRATIONS.

## 6.7 CALIBRATING LOAD SENSING

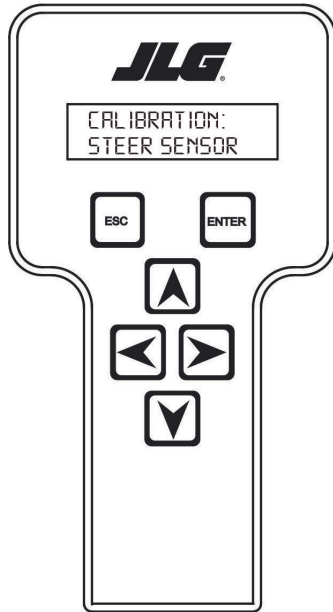
**NOTE:** Calibration sub-menu *LOAD SENSING* is visible only if *MACHINE SET-UP* sub-menu *LOAD SYSTEM* is selected to *NO*.

- Position the Platform/Ground select switch to the Platform position.
- Plug the analyzer into the connector at the base of the platform control box.
- Pull out the Emergency Stop switch and Start the engine.
- The analyzer screen should read:

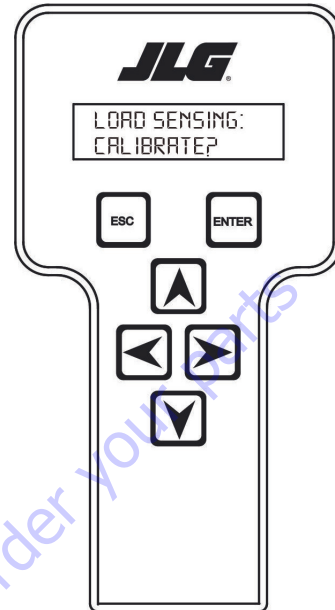


- Use the arrow button to reach *ACCESS LEVEL*. Hit Enter.
- Enter the Access Code, 33271.
- Use the right Arrow key to reach *CALIBRATIONS*. Hit Enter.

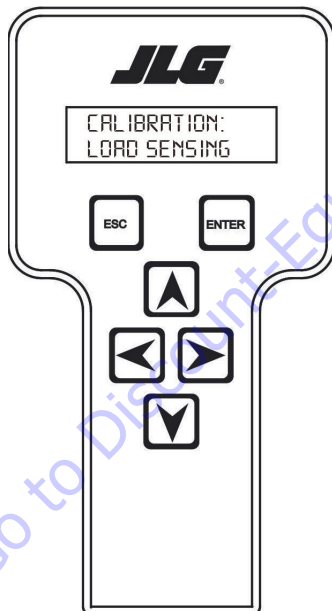
8. Use the arrow keys to reach LOAD SENSING. The screen will read:



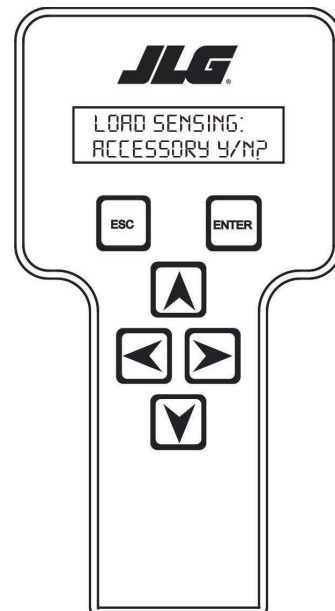
10. Hit Enter. The screen will read:



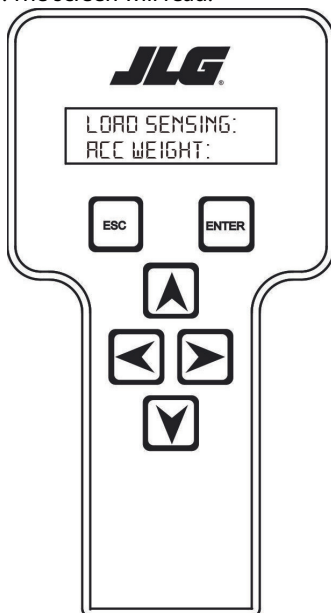
9. Hit Enter. The screen will read:



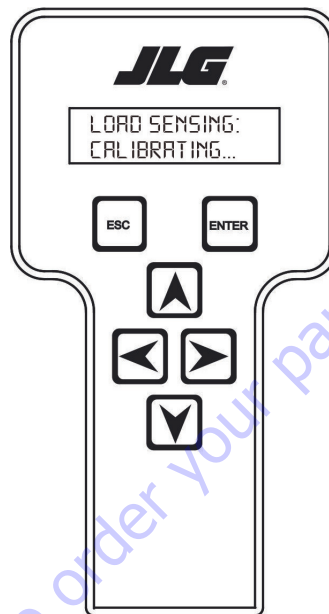
11. Hit Enter. The screen will read:



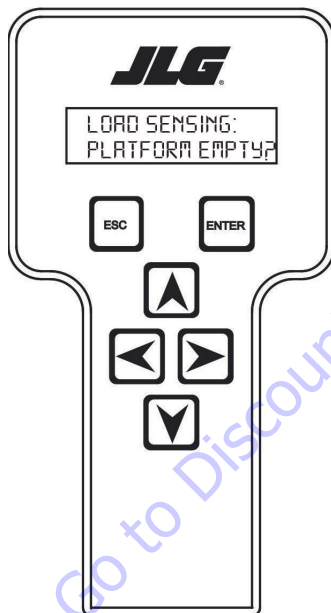
12. Hit Enter. The screen will read:



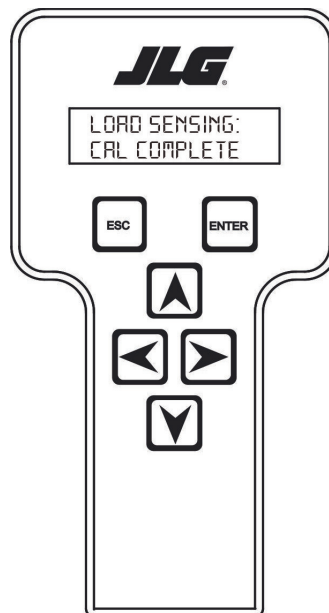
14. Hit Enter. The screen will read:



13. Hit Enter. The screen will read:



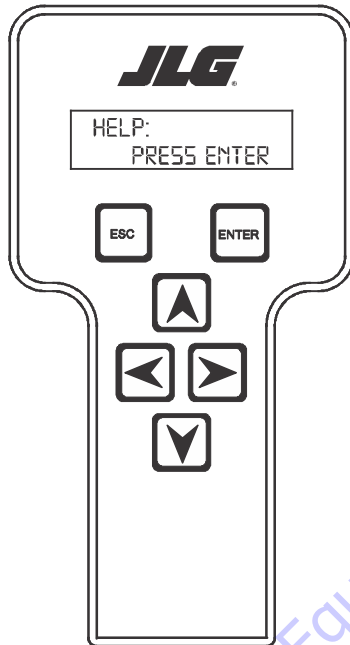
15. After few seconds, the screen will read:



16. Hit ESC twice to go back to CALIBRATIONS.

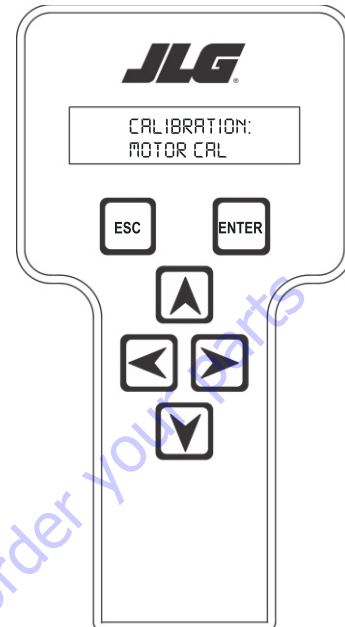
## 6.8 CALIBRATION OF MOTOR (WITH NEW ZAPI MODULE)

1. Position the Platform/Ground select switch to the Platform position.
2. Plug the analyzer into the connector at the base of the platform control box.
3. Pull out the Emergency Stop switch and start the engine.
4. The analyzer screen should read:

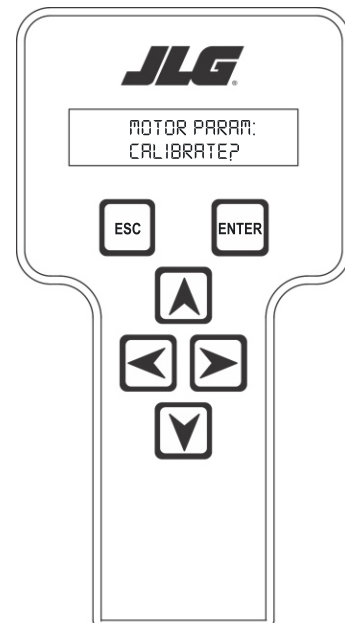


5. Use the arrow button to reach ACCESS LEVEL. Hit Enter.
6. Enter the Access Code, 33271.
7. Use the right Arrow key to reach CALIBRATIONS. Hit Enter.

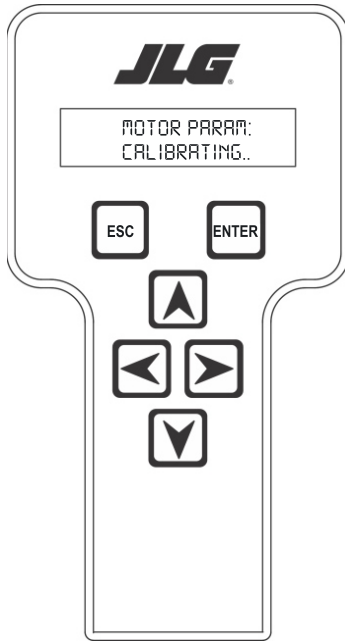
8. The screen will read:



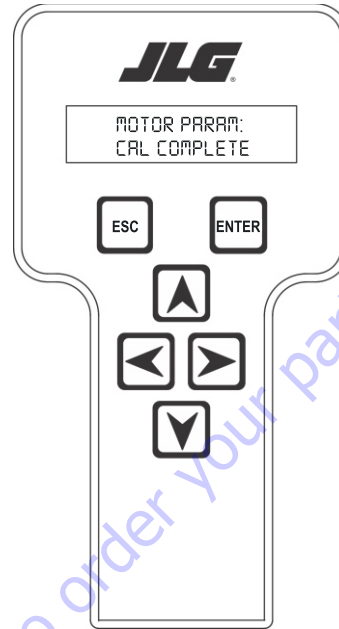
9. Hit Enter. The screen will read:



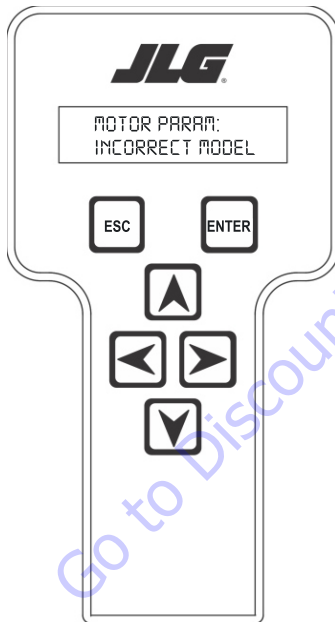
**10.** Hit Enter. The screen will read:



**12.** After few seconds, the screen will read:




**11.** The screen will read:



**13.** Hit ESC twice to go back to CALIBRATIONS.

## 6.9 LSS SYSTEM

The JLG-designed Load Sensing System (LSS) measures platform load via a sensor mounted in the platform support structure. If the actual platform load exceeds the selected Rated Load, the following will occur:

1. The Overload Visual Warning Indicator will flash at the selected control position (platform or ground). 
2. The Platform and Ground Alarms will sound 5 seconds On, and 2 seconds Off.
3. All normal movement will be prevented from the platform control position (optional - ground control functions may be prevented).
4. Further movement is permitted by:
  - a. Removing the excess platform load until actual platform load is less than Rated Load.
  - b. Operation of the overriding emergency system (Auxiliary Power Unit).
  - c. By an authorized person at the ground control position (optional - ground control functions may be prevented).

### NOTICE

**THE LOAD SENSING SYSTEM MUST BE CALIBRATED WHEN ONE OR MORE OF THE FOLLOWING CONDITIONS OCCUR:**

- a. LSS Sensor removal or replacement
- b. Addition or removal of certain platform mounted accessories. (Refer to Calibration)
- c. Platform is removed, replaced, repaired or shows evidence of impact.



### NOTICE

**THE LOAD SENSING SYSTEM REQUIRES PERIODIC FUNCTION VERIFICATION NOT TO EXCEED 6 MONTHS FROM PREVIOUS VERIFICATION. REFER TO TESTING & EVALUATION.**

All calibration procedures are menu driven through the use of a JLG Analyzer.

## Diagnostic Menu

The Diagnostic Menu is another troubleshooting tool for the Load Sensing System. Sensor and status information is presented in real-time for the technician. Several sub-menus exist to organize the data.

To access the Diagnostic Menu, use the LEFT  and RIGHT  Arrow keys to select DIAGNOSTICS from the Top Level

Menu. Press the ENTER key  to view the menu.

Press the LEFT and RIGHT Arrow keys to view the displays and select the various sub-menus. To access a sub-menu, press the ENTER key. Once in a sub-menu, press the LEFT and RIGHT Arrow keys to view the various displays (just like a Top Level


menu). To exit a sub-menu, press the ESC key .

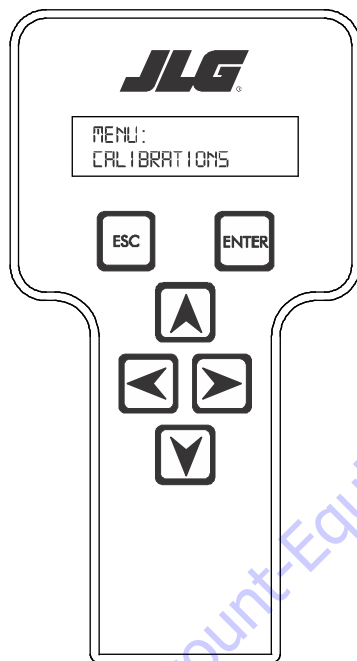
Table 6-10, Diagnostic Menu Descriptions details the structure of the Diagnostic Menu, and describes the meaning of each piece of information presented.

**Table 6-10. Diagnostic Menu Descriptions**


Diagnosics Menu (Displayed on Analyzer 1 <sup>st</sup> Line)	Parameter (Displayed on Analyzer 2 <sup>nd</sup> Line)	Parameter Value (Displayed on Analyzer 2 <sup>nd</sup> Line)	Description
PLATFORM LOAD	STATE:	OK / OVERLOAD	LSS Status.
PLATFORM LOAD	ACTUAL:	XXX.X KG	Calibrated weight of the platform. ??? if Platform Load is Unhealthy**.
PLATFORM LOAD (service*)	GROSS:	XXX.X KG	Gross weight of the platform. ??? if both Cells are Unhealthy**.
PLATFORM LOAD (service*)	OFFSET 1:	XXX.X KG	Stored offset weight of Cell 1. ??? if LSS is not calibrated.
PLATFORM LOAD (service*)	OFFSET 2:	XXX.X KG	Stored offset weight of Cell 1. ??? if LSS is not calibrated.
PLATFORM LOAD (service*)	ACCESSORY	XXX.X KG	Stored accessory weight. ??? if LSS is not calibrated.
PLATFORM LOAD (service*)	UNRESTRICT	XXX.X KG	UGM will set Unrestricted Rated Load as defined by Machine Configuration.
PLATFORM LOAD (service*)	RESTRICT	XXX.X KG	UGM will set Restricted Rated Load as defined by Machine Configuration.
PLATFORM LOAD (service*)	RAW 1:	XXX.X KG	Gross value from Cell 1. ??? if Unhealthy**.
PLATFORM LOAD (service*)	RAW 2:	XXX.X KG	Gross value from Cell 2. ??? if Unhealthy**.
* Indicates only visible in service view mode ** Typically indicates a DTC is active			

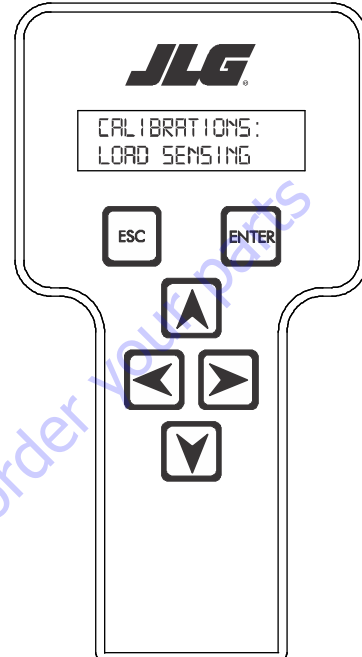
## Calibration Procedure

1. Remove everything from the platform, except permanently fixed JLG Accessories, to allow the Load Sensing System to record its' weight during calibration. This includes all tools, debris, and customer-installed devices.
2. Plug the JLG Analyzer into the Machine at the Ground Station and enter Service Access Password 33271.
3. The platform should be approximately level for calibration. Level the platform from ground control (if necessary) to within +/- 5°.
4. To access the Calibration Menu, use the LEFT and RIGHT Arrow keys to select CALIBRATION from the Top Level Menu. The screen will read:

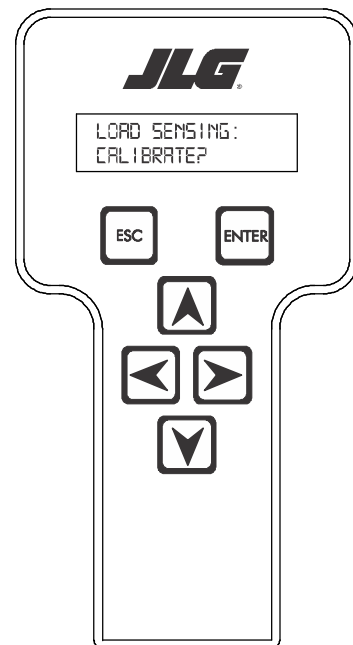


**NOTE:** The Calibration Menu is not available in OPERATOR ACCESS.

5. Press the ENTER key  to view the menu. Upon entry to the Calibration Menu, the JLG Control System will link to the Analyzer and the screen will read:




6. Press Enter . The Screen will read:




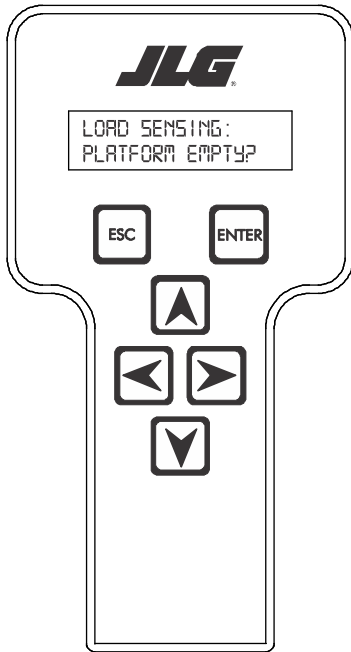
**NOTE:** Calibration will auto fail if LSS DTC's are active (443, 444, 4479, 4480, 663, 821, 822, 823, 824, 8218, 8222 -> 8238, 991, 992, 993, 994 or 99285).




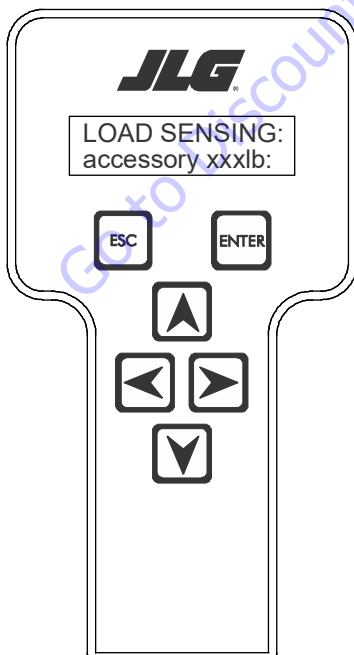
## SECTION 6 - JLG CONTROL SYSTEM

**NOTE:** Pressing the ESC key  after starting calibration and before calibration is complete will display the CAL FAILED message. This will not disturb the prior calibration information.

7. Press ENTER . The analyzer screen will read:




8. If the platform is empty, press ENTER . The screen will read:

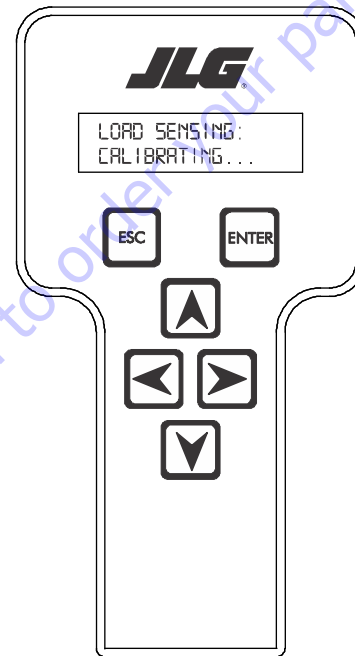


**NOTE:** Accessory weight will reset to 0 lb each time the machine is re-calibrated and will need to be re-entered.

**NOTE:** The Accessory weight will be temporarily stored in the Control System until calibration has been completed successfully.

Refer to Table 6-11, Accessory Weights. Use the up and down analyzer keys to enter the accessory weight(s) (in lbs). When all the accessory weights are entered, press

ENTER . The screen will read:



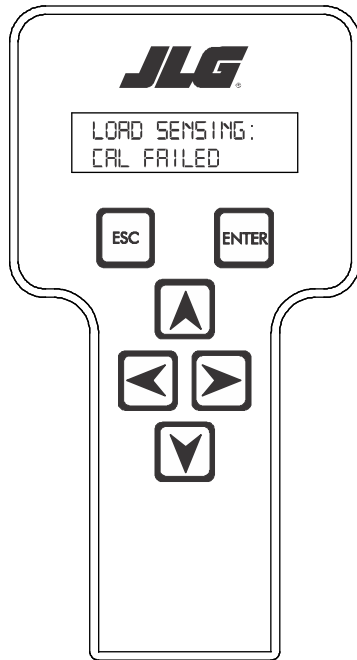
**Table 6-11. Accessory Weights**


Accessory	Weight
SkyWelder (stick welder)	70 lb (32 kg)
SkyWelder Prep	Prep only = 15 lb (7 kg) Full install = 70 lb (32 kg)
SkyCutter (plasma cutter)	70 lb (32 kg)
SkCutter/SkyWelder Combo	140 lb (64 kg)
Fire Extinguisher	45 lb (20 kg)
Overhead SoftTouch	80 lb (36 kg)
WorkSurface	20 lb (9 kg)

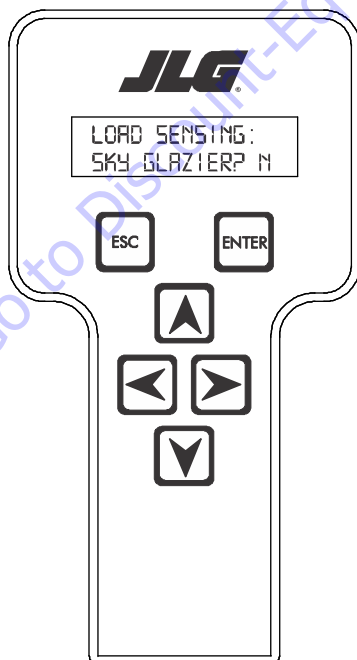
**NOTE:** Not all Accessories are available on every JLG model. Some Accessory combinations are prohibited due to excessive weight and/or load restriction. If any installed JLG Accessories are labeled with weight decals but are not listed in the table above, include their weight when entering the ACC WEIGHT value.

- The control system will calculate the load cell readings and ensure it is greater than 130 lb (59 kg), but less than 575 lb (261 kg).


If the platform weight is not within the allowed range, the calibration attempt will be unsuccessful and the Analyzer will show the following:

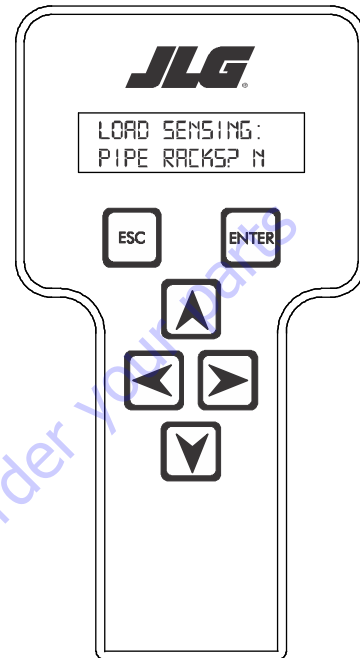


- Press ENTER . The control system will ask for installed accessories. The screen will show the following:




- Use the analyzer keys to select N for no or Y for yes. Press

ENTER . The screen will read:



12. Use the analyzer keys to select N for no or Y for yes. Press

ENTER . The control system will default to an estimate of unrestricted capacity, which can be adjusted if necessary. Refer to Table 6-12, SkyGlazier Capacity Reductions and Table 6-13, Pipe Rack Capacity Reductions.

The screen will read:

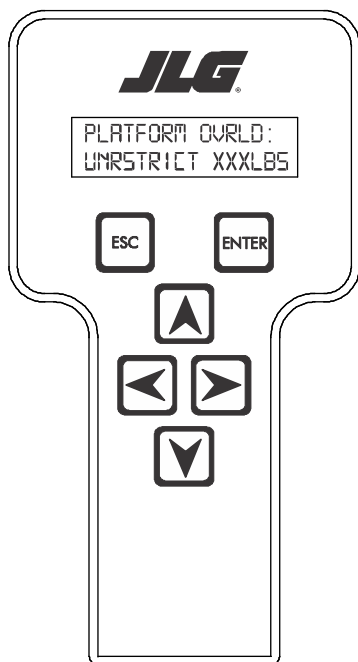


Table 6-12. SkyGlazier Capacity Reductions


Capacity	PLATFORM OVRLD	PLATFORM OVRLD RESTRICT
500 lb (227 kg)	400 lb (181 kg)	n/a
550 lb (250 kg)	400 lb (181 kg)	n/a
600 lb (272 kg)	400 lb (181 kg)	n/a
750 lb (340 kg)	n/a	590 lb (268 kg)
1000 lb (454 kg)	n/a	750 lb (340 kg)

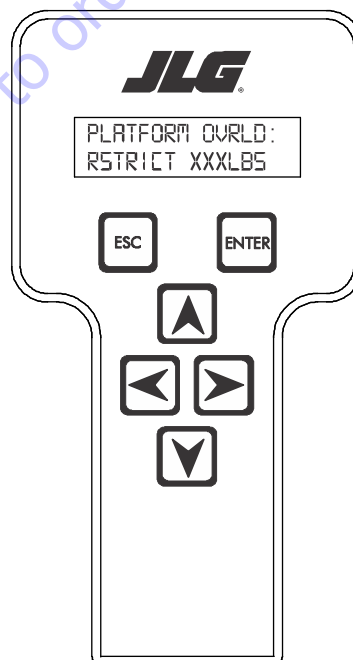
Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.


Table 6-13. Pipe Rack Capacity Reductions

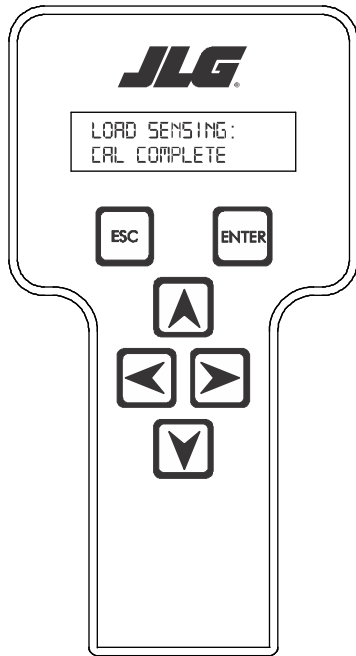
Capacity	PLATFORM OVRLD	PLATFORM OVRLD RESTRICT
500 lb (227 kg)	400 lb (181 kg)	n/a
550 lb (250 kg)	450 lb (204 kg)	n/a
600 lb (272 kg)	500 lb (227 kg)	n/a
750 lb (340 kg)	n/a	650 lb (295 kg)
1000 lb (454 kg)	n/a	900 lb (408 kg)

Note: If both SkyGlazier and Pipe Racks are configured, capacity will be the lower of the two values.

13. Press ENTER . The following screen will be displayed for restricted capacity, which can be adjusted if necessary. Refer to Table 6-12, SkyGlazier Capacity Reductions and Table 6-13, Pipe Rack Capacity Reductions.



14. Press ENTER . If calibration is successful, the screen will read:



Go to Discount-Equipment.com to order your parts

### Testing & Evaluation

Refer to Troubleshooting if the Load Sensing System fails to meet these guidelines.

1. Connect the JLG Analyzer.
2. Level the Platform. The platform should be approximately level for analysis, or the guidelines below will not be applicable. Level the platform from Ground Control (if necessary) to within  $\pm 5$  degrees.
3. Observe the Empty Platform Weight. Proceed to the DIAGNOSTICS, PLTLOAD sub-menu and observe the measured platform load. All tools, debris, and customer-installed devices shall be removed during evaluation. Ideally, the PLTLOAD should be zero but can vary  $\pm 15$ lb ( $\pm 7$ kg). Further, the reading should be stable and should not vary by more than  $\pm 2$ lb ( $\pm 1$ kg) (unless there is heavy influence from wind or vibration).
4. Use the Technician's Weight to Evaluate. The technician should enter the platform and record the PLTLOAD reading while standing in the center of the platform.
5. Confirm Control System Warnings and Interlocks. Using the keyswitch, select Platform Mode and power-up. Start the vehicle's engine and ensure that all controls are functional and the Load Sensing System's Overload Visual and Audible Warnings are not active. Simulate an Overload by unplugging the Shear Beam Load Cell. The Overload Visual Warning should flash, and the Audible Warning (at Platform and Ground) should sound for 5 seconds On, and 2 seconds Off. With the engine running, all control should be prevented. Cycle the Platform EMS to stop the engine and then power-up again. The Overload Visual and Audible Warning should continue. Confirm that controls are responsive when using the Auxiliary Power Unit for emergency movement. Reconnect the Load Cell. The Overload Visual and Audible Warnings should cease and normal control function should return. Switch the vehicle's keyswitch to Ground Mode and repeat the above procedure. The Overload Visual Warning at the Ground Controls should flash, and the Audible Warning (at Platform and Ground) should sound for 5 seconds On, 2 seconds Off. However, the controls should remain functional when using the engine and the Auxiliary Power Unit (if the Control System's MACHINE SETUP, LOAD is set to "2=CUTOUT PLT". If set to "3=CUTOUT ALL", then Ground Controls will be prevented when using the engine as in the platform).
6. Confirm Control System Capacity Indication (optional for vehicles with Dual Capacity Ratings). For vehicles equipped with a Capacity Select switch on the Platform Console Box, it is necessary to examine an additional interface between the Load Sensing System and the Control System. Using the keyswitch, select Platform Mode and power-up. If necessary, put the boom in the transport position (completely stowed) and center the Jib Plus (if equipped). Place the Capacity Select switch in the unrestricted position and ensure that the proper indicator illuminates on the Platform Console Box. Plug the JLG Analyzer into the Analyzer connection and proceed to the DIAGNOSTICS, SYSTEM submenu. Ensure that the CAPACITY displays indicate OFF. Place the Capacity Select switch in the unrestricted position (if so equipped) and ensure that the proper indicator illuminates on the Platform Console Box (but does not flash). For vehicles with unrestricted capacity, ensure that the unrestricted CAPACITY display indicates ON but the restricted CAPACITY indicates OFF. For vehicles with restricted capacity, ensure that the unrestricted CAPACITY display indicates OFF but the restricted CAPACITY indicates ON.
7. Confirm Load Sensing System Performance with Calibrated Weights. Operate the vehicle from Ground Control and place the boom in the transport position (fully stowed) for safety. Plug the JLG Analyzer into the control system connection and proceed to the DIAGNOSTICS, PLTLOAD display. Place 500lb (230kg) in the platform and ensure that PLTLOAD is with  $\pm 5\%$  of the actual weight. For Dual Capacity vehicles, do the same for the alternate capacity (unrestricted or restricted).

## Troubleshooting

The following tables are furnished to provide possible resolutions for common difficulties. Difficulties are classified as General, Calibration, Measurement Performance, and Host System Functionality.

**Table 6-14. LSS Troubleshooting Chart**

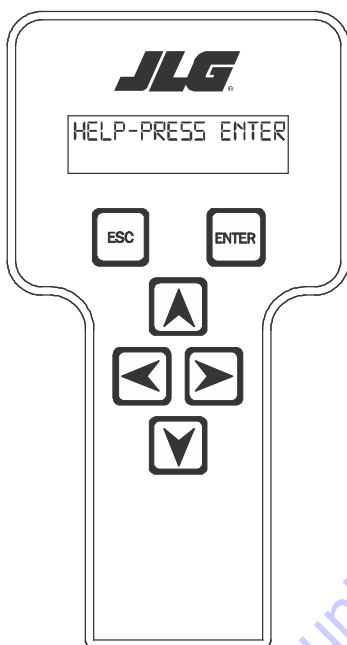
Difficulty	Possible Resolution
<p>Empty Platform Weight (DIAGNOSTICS, PLAT-FORM LOAD) is not within <math>\pm 15\text{lb}</math> (<math>\pm 7\text{kg}</math>) of zero.</p> <p>or</p> <p>Platform Load readings (DIAGNOSTICS, PLTLOAD) are unstable by more than <math>\pm 2\text{lb}</math> (<math>\pm 1\text{kg}</math>) (without the influence of vibration or wind).</p> <p>or</p> <p>There are large variations in Platform Load (DIAGNOSTICS, PLTLOAD) based on the location of the load. Tolerance to variations is 20lb for an evaluation using the technician's weight, and <math>\pm 5\%</math> of Rated Load when using calibrated weights.</p>	<p>The LSS System is unable to properly measure the platform weight.</p> <ol style="list-style-type: none"> <li>1. The Load Cell is not properly plugged into the LSS Harness. It is possible poor electrical contact is made.</li> <li>2. Wiring leading to the Load Cell is damaged. Carefully inspect sensor wiring where it passes through cable clamps for signs of damage. Inspect wiring where damage to the channel is apparent.</li> <li>3. The Load Cell was not assembled properly during installation. Examine the sensor's reading using the JLG Analyzer. Proceed to the DIAGNOSTICS, CELL, LOAD displays and determine if the readings are reasonable. It is often helpful to apply slight downward pressure above the sensor and observe that its output increases (increasing force measurement; decreasing means the sensor is mounted upside-down).</li> <li>4. The Load Cell is contaminated by debris or moisture. Examine the sensor's reading using the JLG Analyzer. Proceed to the DIAGNOSTICS, CELL, LOAD displays and determine if the readings are reasonable and stable (not changing by more than <math>\pm 2\text{lb}</math> (<math>\pm 1\text{kg}</math>) (without the influence of vibration or wind). Lack of measurement stability is a key indication of contamination. Unplug the connector and inspect for dirt or moisture. Look carefully into the female connector on the sensor's cordset for evidence of contamination. Debris should be brushed away with a soft bristle brush (do not introduce any cleaners as they will leave conductive residue). Moisture should be allowed to evaporate or accelerated with a heat-gun (use low heat and be carefully to not melt connector materials). Moisture intrusion into the molded portion of the connector (capillary action into the wire bundle) or the Shear Beam Load Cell itself will require replacement of the sensor.</li> <li>5. The Load Cell has been mechanically damaged. If the Load Cell is physically deformed or has damage to the cover it should be replaced immediately. It is also possible to have invisible mechanical damage resulting from an extreme overload (<math>&gt; 6000\text{lb}</math> [<math>&gt; 2722\text{kg}</math>]).</li> </ol>
<p>The Visual and Audible Overload Warnings fail to sound when platform is loaded beyond Rated Load, or when simulated by unplugging the Load Cell. Controls remain functional at Platform and Ground Control positions.</p>	<p>The Control System is failing to regard the overload signal from the LSS System, or the signal is shorted.</p> <ol style="list-style-type: none"> <li>1. The Load Sensing System must be enabled within the Control System. Plug the JLG Analyzer into the Control System, enter the Access Level 1 password (33271), and examine the MACHINE SETUP, LOAD sub-menu. The selection "2=CUTOUT PLT" should be displayed (platform controls prevented during overload, ground controls remain operational). In country- or customer-specific circumstance, the selection "3=CUTOUT ALL" is used (platform and ground controls prevented during overload).</li> </ol>
<p>The Ground Audible Warning fails to sound, but the Platform Audible Warning sounds properly.</p>	<p>The Ground Alarm is missing or improperly installed. Verify that the device is mounted. Verify wiring from the Main Terminal Box and Ground Module.</p>
<p>Controls remain functional at the Ground Control position during an overload, or when simulated by unplugging the Load Cell. The Controls at the Platform Control position are prevented when using the engine, but not when using the Auxiliary Power Unit.</p>	<p>The JLG Control System is configured to prevent platform controls only in the event of overload. Alternately, the Host Control System can be configured to prevent ground and platform controls for country- or customer-specific circumstances.</p> <p>Using the JLG Analyzer, enter the Access Level 1 password (33271). Proceed to the MACHINE SETUP, LOAD sub-menu. Set this parameter to "2=CUTOUT PLT" to prevent platform controls in the event of overload. Set this parameter to "3=CUTOUT ALL" to prevent platform and ground controls in the event of overload.</p>



### 6.10 RESETTING THE MSSO SYSTEM

1. Use the following procedure to reset the MSSO system.
2. Position the Platform/Ground select switch to the desired position.
3. Plug the analyzer into the connector coming from the ground control module or from the platform console.

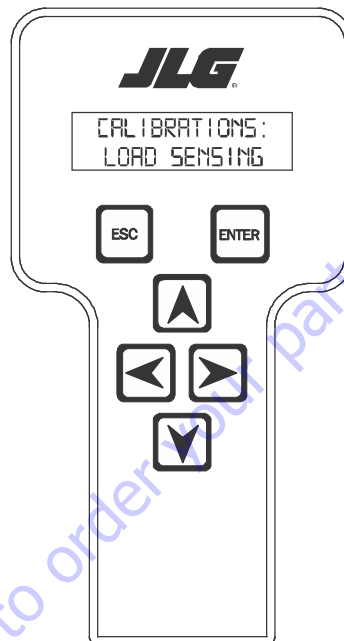
**NOTE:** If performing the procedure from the platform console, the Emergency Stop switch on the ground console must also be pulled out.



4. Pull out the Emergency Stop switch.
5. The analyzer screen should read:



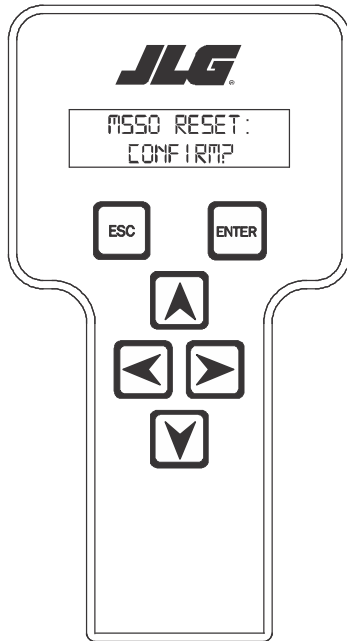
6. Use the arrow button to reach OPERATOR ACCESS. Press  Enter.
7. Enter the Access Code, 33271.
8. Use the right Arrow key to reach MENU: CALIBRATIONS. Press Enter .

9. Use the arrow keys to reach the LOAD SENSING menu. The screen should read:



10. Press ENTER .
11. Use the Down  arrow to reach MSSO RESET.

12. Press Enter . The screen will read:





13. Press Enter . The JLG Control System will reset an active 873 DTC and the MSSO System will be reset. Press Escape  to return to the CALIBRATIONS menu.



Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
001	EVERYTHING OK	The UGM determines that platform station (EVERYTHING OK) OR ground station (GROUND MODE OK) is selected and no system faults exist, including check; 0 (No Fault)	Occurrence of active DTC
002	GROUND MODE OK	The normal help message in Ground Mode. Displays on the analyzer only.	Ground Mode selected; & occurrence of active DTC
008	FUNCTIONS LOCKED OUT - SYSTEM POWERED DOWN	Conditions exist and time for automatic power-down has expired.	Power cycled
0010	RUNNING AT CUTBACK - OUT OF TRANSPORT POSITION	Machine is in the Out Of Transport Position	Machine is not Out of Transport; If Swung, DOS transition requirements are required to return to In Line speed
0011	FSW OPEN	Machine is in Platform Mode; Any of the following Platform inputs become active after power up, but before Machine Enabled: Drive joystick is not in the neutral position, Steer, Lift and/or Swing joystick is not in the neutral position; Tower Lift; Telescope; Platform Level; Platform Rotate; Jib Lift (if MACHINE SETUP -> JIB = YES); Jib Swing (if MACHINE SETUP -> JIB PLUS = YES);	Controls initialized
0012	RUNNING AT CREEP - CREEP SWITCH OPEN	Machine is in Platform Mode; Platform creep switch input = HIGH; Fault RUNNING AT CREEP – TILTED AND ABOVE ELEVATION (0013) is not active	Platform creep switch input = Low
0013	RUNNING AT CREEP - TILTED AND ABOVE ELEVATION	Machine is in Platform mode; Machine is Above Elevation and Tilted; MACHINE SETUP -> TILT (not + CUT)	Not all of the trigger conditions are met; Then non-Creep function speed permitted after controls initialized
0015	LOAD SENSOR READING UNDER WEIGHT	LSS has been calibrated and the UGM has determined that the load sensing system reading is less than -50lb for 2 seconds. If the load sensing system determines that the reading is greater than -50lb for 5 seconds this fault will no longer be annunciated.  No control system interlocks present when DTC is active.	Ensure platform is not resting on the ground or is not leveled at an extreme negative angle.  Re-calibrate the load sensing system if the above items are not a factor.
0033	TRACTION MOTOR AT CURRENT LIMIT	Machine is in Platform Mode and UGM detects that Traction Current reported by any Power Module > 270A for 3000ms; MTM or SPM will keep the Traction motor current below limit (280A@48V) but will not report fault;	Currents return to levels below trigger level for same time period as trigger; UGM shall remove Creep speed restriction after controls initialized
0036	FUNCTION PREVENTED - FUNCTION SELECTED BEFORE GROUND ENABLE	Machine is in Ground Mode (DTC 002); Machine is not enabled; Any valid ground control input becomes active;	Controls Initialized.
0039	SKYGUARD ACTIVE – FUNCTIONS CUTOUT	Machine is in Platform Mode and SkyGuard Enabled	Trigger conditions are no longer true

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
0046	TORQUE CUTBACK - EXCESSIVE TILT	UGM detects that the machine is ascending an inclination of greater than or equal to: 28 degrees for period of greater than 1 second. [MACHINE SETUP = E600 2WD/4WD].	The UGM detects that the grade in direction of travel is more than 3 degrees less than the machine's trip point
0047	DRIVING IN CREEP – STEEP DESCENT	UGM detects that the machine is descending a grade steeper than the MAX Grade setpoint (greater than or equal to): MAX Grade Setpoint = 28 degrees for a period of greater than 1 second. [MACHINE SETUP = 600 2WD/4WD].	The UGM detects that the grade in direction of travel is more than 3 degrees less than the machine's trip point.
0048	BATTERY CHARGE LOW	Battery SOC < 10%	Battery SOC > Discharged; speed restrictions removed after controls initialized
211	POWER CYCLE	The normal help message is issued to designate the start of each power cycle in Analyzer Logged Help; new entry only recorded if new DTCs occurred since last power cycle	No special conditions required
212	KEYSWITCH FAULTY	UGM Ground Mode (input J7-3) and UGM Platform Mode (input J7-2) are both HIGH at the same time	UGM Ground Mode (input J7-3) or UGM Platform Mode (input J7-2) = LOW
213	FSW FAULTY	The ground footswitch input and platform footswitch input have been both HIGH or both LOW for greater than or equal to 1 second	Power cycled
221	FUNCTION PROBLEM - HORN PERMANENTLY SELECTED	The horn switch was closed during power-up	Horn switch input = LOW
224	FUNCTION PROBLEM - STEER LEFT PERMANENTLY SELECTED	Machine in Platform Mode; Steer Left Switch input = HIGH at Startup	Steer Left Switch returns to neutral; steer functions enabled after remaining controls are initialized
225	FUNCTION PROBLEM - STEER RIGHT PERMANENTLY SELECTED	Machine in Platform Mode; Steer Right Switch input = HIGH at Startup	Steer Right Switch returns to neutral; Steer functions enabled after remaining controls are initialized
227	STEER SWITCHES FAULTY	Both steer switch inputs on the Drive/Steer joystick are High (detectable in Platform or Ground mode).	Steer Right and Steer Left are no longer simultaneous HIGH: steer and full Drive speed permitted after controls are initialized
2211	FSW INTERLOCK TRIPPED	Machine is in Platform Mode; A Machine Enabled state has been active for greater than or equal to 7 seconds without activation of any drive, steer, or boom functions	The footswitch is released
2212	DRIVE LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	The machine is in Platform Mode and the drive joystick is not in the neutral position immediately following Start Up. The machine is in Platform Mode and a proper machine enable signal is received or DTC 2213, 2221 or 2223 is active while the drive joystick is not in the neutral position.	If triggered by the drive joystick not being in the neutral position immediately following Start Up THEN when Drive joystick is returned to its neutral position and the machine is not in the Enabled state. If triggered by proper machine enable signal being received while the drive joystick is not in the neutral position then when the Drive joystick is returned to neutral or the footswitch is released
2213	STEER LOCKED - SELECTED BEFORE FOOTSWITCH	The UGM detects that the machine is in Platform Mode and a proper machine enable signal is received or DTC 2212, 2221 or 2223 is active while the steer controls are not in the neutral position.	When the steer controls are returned to neutral or the footswitch is released

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
2216	D/S JOY. OUT OF RANGE HIGH	The PM detects that the drive or steer joystick signal voltage > 8.1V and reports the fault to the UGM.	The PM no longer reports the fault
2217	D/S JOY. CENTERTAP BAD	The PM detects that the drive/steer center tap voltage is not between 3.31 volts and 3.75 volts and reports the fault to the UGM	The PM detects that the drive/steer center tap voltage is between 3.31 and 3.75 volts and no longer reports the fault to the UGM
2219	L/S JOY. OUT OF RANGE HIGH	The PM detects that the Lift or Swing joystick signal voltage > 8.1V and reports the fault to the UGM.	The PM detects that the lift/swing center tap voltage is between 3.31 and 3.75 volts and no longer reports the fault to the UGM
2220	L/S JOY. CENTERTAP BAD	The PM detects that the Lift or Swing center tap voltage is not between 3.31 volts and 3.75 volts and reports the fault to the UGM	The PM detects that the lift/swing center tap voltage is between 3.31 and 3.75 volts and no longer reports the fault to the UGM
2221	LIFT/SWING LOCKED - JOYSTICK MOVED BEFORE FOOTSWITCH	The machine is in Platform Mode and the Lift and/or Swing controls are not in the neutral position immediately following Start Up -OR- The machine is in Platform Mode and a proper machine enable signal is received or DTC 2212, 2213 or 2223 is active while the Lift/Swing joystick is not in the neutral position.	If triggered by the Lift/Swing controls not being in the neutral position immediately following Start Up, then when Lift/Swing controls are returned to neutral and the machine is not in the Enabled state. If triggered by proper machine enable signal being received while the Lift/Swing controls are not in the neutral position, then when the Lift/Swing controls are returned to neutral or the footswitch is released
2222	WAITING FOR FSW TO BE OPEN	Machine is in Platform Mode AND Footswitch has been engaged since Start Up	Footswitch is disengaged
2223	FUNCTION SWITCHES LOCKED - SELECTED BEFORE ENABLE	The machine is in Platform Mode and a proper machine enable signal is received or DTC 2212, 2213 or 2221 is active while any of the following boom control inputs are engaged: AWDA Enable, Tower Lift, Telescope, Platform Level, Platform Rotate, Jib Lift (if MACHINE SETUP -> JIB = YES) and Jib Rotate (if MACHINE SETUP -> JIB PLUS = YES)	None of the boom controls that trigger this fault are engaged or the Footswitch is disengaged.
2245	FUNCTION PROBLEM - JIB SWING LEFT PERMANENTLY SELECTED	The machine is in Platform mode and the Jib Swing Left input = High at Startup	Jib Swing Left input = LOW while the machine is not Enabled
2246	FUNCTION PROBLEM - JIB SWING RIGHT PERMANENTLY SELECTED	The machine is in Platform mode and the Jib Swing Right input = High at Startup	Jib Swing Right input = LOW while the machine is not Enabled
2247	FUNCTION PROBLEM - PLATFORM ROTATE LEFT PERMANENTLY SELECTED	The machine is in Platform mode and the Platform Rotate Left input = High at Startup	Platform Rotate Left input = LOW while the machine is not Enabled
2248	FUNCTION PROBLEM - PLATFORM ROTATE RIGHT PERMANENTLY SELECTED	The machine is in Platform mode and the Platform Rotate Right input = High at Startup	Platform Rotate Right input = LOW while the machine is not Enabled
2249	FUNCTION PROBLEM - JIB LIFT UP PERMANENTLY SELECTED	The machine is in Platform mode and the Jib Lift Up input = High at Startup	Jib Lift Up input = LOW while the machine is not Enabled
2250	FUNCTION PROBLEM - JIB LIFT DOWN PERMANENTLY SELECTED	The machine is in Platform mode and the Jib Lift Down input = High at Startup	Jib Lift Down input = LOW while the machine is not Enabled
2251	FUNCTION PROBLEM - TELESCOPE IN PERMANENTLY SELECTED	The machine is in Platform mode and the Telescope In input = High at Startup	Telescope In input = LOW while the machine is not Enabled
2252	FUNCTION PROBLEM - TELESCOPE OUT PERMANENTLY SELECTED	The machine is in Platform mode and the Telescope Out input = High at Startup	Telescope Out input = LOW while the machine is not Enabled
2262	FUNCTION PROBLEM - PLATFORM LEVEL UP PERMANENTLY SELECTED	The machine is in Platform mode and the Platform Level Up input = High at Startup	Platform Level Up input = LOW while the machine is not Enabled

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
2263	FUNCTION PROBLEM - PLATFORM LEVEL DOWN PERMANENTLY SELECTED	The machine is in Platform mode and the Platform Level Down input = High at Startup	Platform Level Down input = LOW while the machine is not Enabled
2264	FUNCTION PROBLEM - DOS OVERRIDE PERMANENTLY SELECTED	The machine is in Platform mode and the Drive Orientation switch input = High at Startup	Drive Orientation input = LOW while the machine is not Enabled
2286	FUNCTION PROBLEM - SOFT TOUCH / SKY-GUARD OVERRIDE PERMANENTLY SELECTED	[(MACHINE SETUP → SKYGUARD = YES) or (MACHINE SETUP → SOFT TOUCH = YES)]; Machine is in Platform Mode; The Soft Touch / SkyGuard Override switch input = High at Startup	The Soft Touch / SkyGuard Override switch input = Low
2291	FUNCTION PROBLEM - AWDENABLE PERMANENTLY SELECTED	The machine is in Platform mode and the AWDA Enable switch input = High at Startup	AWD Enable input = LOW while the machine is not Enabled
234	FUNCTION SWITCHES FAULTY - CHECK DIAGNOSTICS/BOOM	Both inputs associated with mutually exclusive operations are simultaneously active.	Trigger conditions no longer true.
2310	FUNCTION PROBLEM - GROUND ENABLE PERMANENTLY SELECTED	The machine is in Ground mode and the Function Enable input = High at Startup	Enable switch = LOW; Enable permitted after controls initializ
2370	FUNCTION PROBLEM - JIB LIFT UP PERMANENTLY SELECTED	If MACHINE SETUP ü JIB = YES and the machine is in Ground mode and the subject switch input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
2371	FUNCTION PROBLEM - JIB LIFT DOWN PERMANENTLY SELECTED	If MACHINE SETUP ü JIB = YES and the machine is in Ground mode and the subject switch input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
2372	FUNCTION PROBLEM - SWING LEFT PERMANENTLY SELECTED	The machine is in Ground mode and the Swing Left = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
2373	FUNCTION PROBLEM - SWING RIGHT PERMANENTLY SELECTED	The machine is in Ground mode and the Swing Right input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23107	FUNCTION PROBLEM - LIFTUP PERMANENTLY SELECTED	The machine is in Ground mode and the Lift Up input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23108	FUNCTION PROBLEM - LIFT DOWN PERMANENTLY SELECTED	The machine is in Ground mode and the Lift Down input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23109	FUNCTION PROBLEM - TELESCOPE IN PERMANENTLY SELECTED	The machine is in Ground mode and the Telescope In input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23110	FUNCTION PROBLEM - TELESCOPE OUT PERMANENTLY SELECTED	The machine is in Ground mode and the Telescope Out input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23111	FUNCTION PROBLEM - PLATFORM LEVEL UP PERMANENTLY SELECTED	The machine is in Ground mode and the Platform Level Up input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23112	FUNCTION PROBLEM - PLATFORM LEVEL DOWN PERMANENTLY SELECTED	The machine is in Ground mode and the Platform Level Down input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23113	FUNCTION PROBLEM - PLATFORM ROTATE LEFT PERMANENTLY SELECTED	The machine is in Ground mode and the Platform Rotate Left input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23114	FUNCTION PROBLEM - PLATFORM ROTATE RIGHT PERMANENTLY SELECTED	The machine is in Ground mode and the Platform Rotate Right input = High at Start Up	Function switch returns to neutral and the machine is not in the Enabled state.
23163	FUNCTION PROBLEM - MSSO PERMANENTLY SELECTED	UGM determines that MSSO low-side switch is selected at Startup	Function switch returns to neutral and the machine is not in the Enabled state.
23171	FUNCTION PROBLEM - JIB SWING LEFT PERMANENTLY SELECTED	The machine is in Ground mode and the Jib Swing Left input = High at Start Up	Jib Swing Left input = LOW and the machine is not in the Enabled state.
23172	FUNCTION PROBLEM - JIB SWING RIGHT PERMANENTLY SELECTED	The machine is in Ground mode and the Jib Swing Right input = High at Start Up	Jib Swing Right input = LOW and the machine is not in the Enabled state.

**Table 6-15. Diagnostic Trouble Codes**

DTC	DTC Text	Fault Description	Solution
23253	MACHINESETUPWIRING - ERROR	The UGM shall force this on the first power-up after programming to store the proper jumper config and reset any related defaults. The UGM detects any of the following conditions: Stored Jumper Config Status? Jumper Configuration; Jumper Config Status < 2 and (Platform Light Panel is detected on the CANbus)	Existing trigger conditions are not met OR Tilt Cal is performed and new Configuration Status stored. When new config status is stored, reset the following defaults in Market Setup: Tilt, SkyGuard and Load System for whatever jumper is present.
241	AMBIENT TEMPERATURE SENSOR - OUT OF RANGE LOW	System is in platform mode; MACHINE SETUP -> TEMP CUTOUT = yes; Low Temperature Cutout Sensor reads less than or equal to -50 C.f	Ambient Temperature sensor reading > -50 °C THEN speed restrictions removed after controls are initialized
242	AMBIENT TEMPERATURE SENSOR - OUT OF RANGE HIGH	System is in platform mode; MACHINE SETUP -> TEMP CUTOUT = yes; Low Temperature Cutout Sensor reads greater than or equal to 85 C.	Ambient Temperature sensor reading > -50 °C; Speed restrictions removed after controls are initialized
253	DRIVE PREVENTED - CHARGER CONNECTED	MACHINE SETUP => CHARGER INTERLOCK = DRIVE ONLY;	Trigger conditions not true; Restrictions remove after Cntlni
259	MODEL CHANGED - HYDRAULICS SUSPENDED - CYCLE EMS	The MACHINE SETUP => MODEL has changed	Power cycle
2514	BOOM PREVENTED - DRIVE SELECTED	MACHINE SETUP => FUNCTION CUTOUT = BOOM CUTOUT; Drive or Steer is already engaged; The boom is Above Elevation; The operator is attempting to activate one of the boom functions DTC 2514 supersedes DTC 2518 if drive/steer and boom functions are both active when machine transitions from Below Elevation to Above Elevation.	Not all of the trigger conditions are met
2516	DRIVE PREVENTED - ABOVE ELEVATION	MACHINE SETUP => FUNCTION CUTOUT = DRIVE CUTOUT; The boom is Above Elevation; The operator is attempting to activate Drive or Steer;	Not all of the trigger conditions are met
2517	DRIVE PREVENTED - TILTED & ABOVE ELEVATION	Machine is in Platform mode Machine is Above Elevation and Tilted MACHINE SETUP 'TILT' X DEGREES + DRV CUT and the operator is attempting to activate Drive or Steer. Where X = 3, 4 or 5 Degrees.	At least one of the trigger conditions is not met; then non-Creep function speed permitted after controls initialized.
2518	DRIVE PREVENTED - BOOM SELECTED	MACHINE SETUP => FUNCTION CUTOUT = DRIVE CUTOUT; The boom is Above Elevation; The operator is attempting to activate Drive or Steer;	Not all of the trigger conditions are met
2538	FUNCTION PREVENTED - CHARGER CONNECTED	MACHINE SETUP => CHARGER INTERLOCK = CUT-OUT ALL; MTM reports charger connected; UGM determines that machine is Enabled, and a function command was attempted.	Not all of the trigger conditions are met; Restricts removed after Cntlni
2548	SYSTEM TEST MODE ACTIVE	UGM determines that System Test Mode is active	Power cycled
2549	DRIVE & BOOM PREVENTED - SOFT TOUCH ACTIVE	MACHINE SETUP -> SOFT TOUCH = YES; Machine is in Platform Mode; Soft Touch State = Enabled	Not all of the trigger conditions are met

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
2563	SKYGUARD SWITCH – DISAGREEMENT	MACHINE SETUP => SKYGUARD ≠ NO; Machine is in Platform Mode; [(SkyGuard input #1 Platform Module J7-18) ≠ (SkyGuard input #2 Platform Module J1-23)] > 160ms	[(SkyGuard inputs (Platform Module J7-18 = High) and (Platform Module J1-23 = High)) and (Footswitch State = Not Depressed)]
2564	DRIVE PREVENTED – LEFT BRAKE NOT RELEASING	Module detects brakes have not released because EB coil is damaged	Power cycle
2565	DRIVE PREVENTED – RIGHT BRAKE NOT RELEASING	Module detects brakes have not released because EB coil is damaged	Power cycle
2568	TEMPERATURE CUTOOUT ACTIVE – AMBIENT TEMPERATURE TOO LOW	Low Temperature Cutout = Active	Low Temperature Cutout = Inactive; speed restrictions removed after controls are initialized
2576	PLATFORM LEVEL PREVENTED – ABOVE ELEVATION	UGM has determined that all of the following conditions exists: Platform Level Override Cutout = Enabled; Machine is Enabled; The Platform Level Up or Down switch input = High;	Not all of the trigger conditions are met
2578	FUNCTION PREVENTED – TILTED & ABOVE ELEVATION	Machine is in Platform mode Machine is Above Elevation and Tilted MACHINE SETUP → TILT → X DEGREES + CUT and the operator is attempting to activate Drive or Steer, Lift Up, Tower Up or Telescope Out. Where X = 3, 4, or 5 Degrees)	At least one of the trigger conditions is not met; then non-Creep function speed permitted after controls initialized.
2579	DRIVE PREVENTED – EXCESSIVE GRADE	DTC0046 is active; Drivespeed request, in direction of ascending grade, is greater than zero;	CntlNi (drive joystick returned to center position)
2587	RUNNING AT CREEP - PLATFORM LEVELED UNDER	The PlatformLeveledUnderState == TRUE	The PlatformLeveledUnderState == False
3111	MAIN CONTACTOR DRIVER – PERMANENTLY OFF	Master Traction Module detects that the line contactor driver is out of order and not able to close.	Power cycle
3112	MAIN CONTACTOR – OPEN CIRCUIT	Master Traction Module detects current through Contactor Coil but no voltage on Contactor contacts during active traction or pump.	Power cycled
3212	MAIN CONTACTOR – WELDED OR MISWIRED	Master Traction Module determines at Startup that Line Contactor is closed/stuck before command	Power cycle
3213	MAIN CONTACTOR DRIVER – PERMANENTLY ON	Master Traction Module detects that the line contactor driver output failed short or contactor coil is disconnected/open circuit.	Power cycle
334	LIFT UP VALVE – OPEN CIRCUIT	The UGM detects OC at the Lift Up Solenoid.	UGM no longer detects OC; Speed restriction removed after CntlNi;
336	LIFT DOWN VALVE – OPEN CIRCUIT	The UGM detects OC at the Lift Down Solenoid.	UGM no longer detects open circuit; Inhibits and restrictions removed after CntrlNi;
337	STEER LEFT VALVE – SHORT TO BATTERY	UGM detects a short to battery at steer left output.	Power cycle
338	STEER LEFT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at steer left output	UGM no longer detects OC; Speed restriction removed after CntlNi.
339	STEER RIGHT VALVE – SHORT TO BATTERY	The UGM detects a short to battery at steer right output	Power cycle
3310	STEER RIGHT VALVE – OPEN CIRCUIT	The UGM detects an open circuit at steer right output	UGM no longer detects OC; Speed restriction removed after CntlNi.
3311	GROUND ALARM – SHORT TO BATTERY	The UGM detects a short to 12V battery at this output	Power cycle

**Table 6-15. Diagnostic Trouble Codes**

<b>DTC</b>	<b>DTC Text</b>	<b>Fault Description</b>	<b>Solution</b>
3371	GROUND ALARM – SHORT TO GROUND	The UGM detects a short to ground at this output	Power cycle
3372	GROUND ALARM - OPEN CIRCUIT	The UGM detects an open-circuit at this output J2-2 when MACHINE SETUP ' ALARM/HORN = SEPARATE.	Power cycle
3376	HEADTAIL LIGHT - SHORT TO GROUND	MACHINE SETUP -> H & T LIGHTS = YES; UGM detects a short to ground at head/tail light relay output	Power cycle
3377	HEADTAIL LIGHT - OPEN CIRCUIT	MACHINE SETUP -> H & T LIGHTS = YES; UGM detects a short to ground at head/tail light relay output	UGM no longer detects open circuit
3378	HEADTAIL LIGHT - SHORT TO BATTERY	MACHINE SETUP -> H & T LIGHTS = YES; UGM detects a short to battery at head/tail light relay output	Power cycle
33100	JIB LIFT UP VALVE - SHORT TO GROUND	Machine Setup -> Jib = YES; UGM detects a short to ground at the jib lift up output;	Power cycle
33101	JIB LIFT UP VALVE - OPEN CIRCUIT	Machine Setup -> Jib = YES; UGM detects a open circuit at the jib lift up output	UGM no longer detects OC; Speed restriction removed after CntlNi;
33102	JIB LIFT UP VALVE - SHORT TO BATTERY	Machine Setup -> Jib = YES; UGM detects a short to battery at the jib lift up output	Power cycle
33103	JIB LIFT DOWN VALVE - SHORT TO GROUND	Machine Setup -> Jib = YES; UGM detects a short to ground at the jib lift down output	Power cycle
33104	JIB LIFT DOWN VALVE - OPEN CIRCUIT	Machine Setup -> Jib = YES; UGM detects a open circuit at the jib lift down output	UGM no longer detects open circuit; Inhibits and restrictions removed after CntlNi;
33105	JIB LIFT DOWN VALVE - SHORT TO BATTERY	Machine Setup -> Jib = YES; UGM detects a short to battery at the jib lift down output	Power cycle
33118	SWING RIGHT VALVE - SHORT TO GROUND	The UGM detects a short to ground at the Swing Right output	Power cycle
33119	SWING RIGHT VALVE - OPEN CIRCUIT	The UGM detects an open circuit at the Swing Right output	UGM no longer detects OC; Speed restrictions removed after CntlNi
33120	TELESCOPE IN VALVE - SHORT TO BATTERY	The UGM detects a short to 12V battery at this output	Power cycle
33122	SWING LEFT VALVE - SHORT TO GROUND	The UGM detects a short to ground at the Swing Left output	Power cycle
33123	TELESCOPE OUT VALVE - SHORT TO BATTERY	The UGM detects a short to 12V battery at this output	Power cycle
33182	LIFT VALVES - SHORT TO BATTERY	UGM detects a short to 12V battery at either the Lift Up or Lift Down valve	Power cycle
33186	TELESCOPE OUT VALVE - OPEN CIRCUIT	UGM detects an open circuit at this output	UGM no longer detects OC. Speed restrictions removed after CntlNi
33188	TELESCOPE OUT VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power cycle
33189	TELESCOPE IN VALVE - OPEN CIRCUIT	The UGM detects an open circuit at this output	UGM no longer detects OC. Speed restrictions removed after CntlNi
33190	TELESCOPE IN VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power cycle
33208	HORN - SHORT TO BATTERY	The UGM detects a short to 12V battery at this output J2-27 when MACHINE SETUP ' ALARM/HORN = SEPARATE.	Power cycle



Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
33295	SWING LEFT VALVE - OPEN CIRCUIT	The UGM detects an open circuit at the Swing Left output	UGM no longer detects OC; Speed restrictions removed after CntlIn
33298	STEER LEFT - SHORT TO GROUND	The UGM detects a short to ground at steer left output.	Power cycle
33305	STEER RIGHT - SHORT TO GROUND	The UGM detects a short to ground at steer right output.	Power cycle
33314	FLOW CONTROL VALVE - OPEN CIRCUIT	The UGM detects an OC at this output	Power cycle
33315	FLOW CONTROL VALVE - SHORT TO BATTERY	The UGM detects a short to 12V battery at this output	Power cycle
33316	FLOW CONTROL VALVE - SHORT TO GROUND	The UGM detects a short to ground at this output	Power cycle
33383	BEACON LIGHT - OPEN CIRCUIT	UGM detects an Open Circuit condition at the specified output.	UGM no longer detects OC
33384	BEACON LIGHT - SHORT TO GROUND	UGM detects a Short To Ground condition at the specified output.	Power cycle
33562	BEACON LIGHT - SHORT TO BATTERY	UGM detects a Short to Battery condition at the specified output.	Power cycle
33406	LIFT UP VALVE - SHORT TO GROUND	The UGM detects STG at the Lift Up Solenoid	Power cycle
33407	LIFT DOWN VALVE - SHORT TO GROUND	The UGM detects STG at the Lift Down Solenoid	Power cycle
33412	SWING VALVES - SHORT TO BATTERY	The UGM detects a short to 12V battery at the either Swing output	Power cycle
33479	VOTING RELAY - SHORT TO BATTERY	UGM detects a short to battery at this output	Power cycle
33480	VOTING RELAY - SHORT TO GROUND	UGM detects a short to ground at the voting relay output	Power cycle
33549	VOTING RELAY - OPEN CIRCUIT	UGM detects an open circuit at the voting relay output	Power cycle
341	PLATFORM LEVEL UP VALVE - OPEN CIRCUIT	PCM detects an open circuit at the platform level up output	Power cycle
342	PLATFORM LEVEL UP VALVE - SHORT TO BATTERY	PCM detects a short to battery at the platform level up output	Power cycle
343	PLATFORM LEVEL UP VALVE - SHORT TO GROUND	PCM detects a short to ground at the platform level up output	Power cycle
345	PLATFORM LEVEL DOWN VALVE - OPEN CIRCUIT	PCM detects an open circuit at the platform level down output	Power cycle
346	PLATFORM LEVEL DOWN VALVE - SHORT TO BATTERY	PCM detects a short to battery at the platform level down output	Power cycle
347	PLATFORM LEVEL DOWN VALVE - SHORT TO GROUND	PCM detects a short to ground at the platform level down output	Power cycle
349	PLATFORM ROTATE LEFT VALVE - OPEN CIRCUIT	PCM detects an open circuit at the platform rotate left output	Power cycle
3410	PLATFORM ROTATE LEFT VALVE - SHORT TO BATTERY	PCM detects a short to battery at the platform rotate left output	Power cycle
3411	PLATFORM ROTATE LEFT VALVE - SHORT TO GROUND	PCM detects a short to ground at the platform rotate left output	Power cycle
3412	PLATFORM ROTATE RIGHT VALVE - OPEN CIRCUIT	PCM detects an open circuit at the platform rotate right output	Power cycle
3413	PLATFORM ROTATE RIGHT VALVE - SHORT TO BATTERY	PCM detects an short to battery at the platform rotate right output	Power cycle



Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
3414	PLATFORM ROTATE RIGHT VALVE - SHORT TO GROUND	PCM detects an short to ground at the platform rotate right output	Power cycle
3421	JIB ROTATE LEFT VALVE - OPEN CIRCUIT	MACHINE SETUP -> JIB PLUS = YES and PCM detects an open circuit at the jib rotate left output	Power cycle
3422	JIB ROTATE LEFT VALVE - SHORT TO BATTERY	MACHINE SETUP -> JIB PLUS = YES and PCM detects a short to battery at the jib rotate left output	Power cycle
3423	JIB ROTATE LEFT VALVE - SHORT TO GROUND	MACHINE SETUP -> JIB PLUS = YES and PCM detects a short to ground at the jib rotate left output	Power cycle
3424	JIB ROTATE RIGHT VALVE - OPEN CIRCUIT	MACHINE SETUP -> JIB PLUS = YES and PCM detects an open circuit at the jib rotate right output	Power cycle
3425	JIB ROTATE RIGHT VALVE - SHORT TO BATTERY	MACHINE SETUP -> JIB PLUS = YES and PCM detects a short to battery at the jib rotate right output	Power cycle
3426	JIB ROTATE RIGHT VALVE - SHORT TO GROUND	MACHINE SETUP -> JIB PLUS = YES and PCM detects a short to ground at the jib rotate right output	Power cycle
4219	REAR LEFT MODULE TEMPERATURE - OUT OF RANGE	The Power Module temperature sensor is out of the permitted operating range and reports a fault	Traction module no longer reporting fault; Creep restriction removed after controls initialized
4220	REAR RIGHT MODULE TEMPERATURE - OUT OF RANGE	The Front Right Power Module temperature sensor is out of the permitted operating range and reports a fault	Traction module no longer reporting fault; Creep restriction removed after controls initialized
4223	REAR LEFT MODULE TOO HOT - PLEASE WAIT	Associated Power Module has reached thermal cut-out limit	Traction module no longer reporting fault; Creep restriction removed after controls initialized
4224	REAR RIGHT MODULE TOO HOT - PLEASE WAIT	Front Right Power Module has reached thermal cut-out limit	Traction module no longer reporting fault; Creep restriction removed after controls initialized
4228	REAR LEFT MOTOR TEMPERATURE - OUT OF RANGE	The Power Module reports that motor temperature sensor is out of range due to Open-Circuit (Temp Out of Range – High > 240°C), STG (Temp Out of Range – Low < -30°C) or damage	Traction module no longer reporting fault; Creep restriction removed after controls initialized
4229	REAR RIGHT MOTOR TEMPERATURE - OUT OF RANGE	The Power Module reports that motor temperature sensor is out of range due to Open-Circuit (Temp Out of Range – High > 240°C), STG (Temp Out of Range – Low < -30°C) or damage	Traction module no longer reporting fault; Creep restriction removed after controls initialized
4232	REAR LEFT MOTOR TOO HOT - PLEASE WAIT	The UGM determines that the drive motor temperature reported by the PM > 140°C but < 200°C or the PM determines that motor temperature sensor is reporting > 150°C UGM to suppress if DTCs 4228 is active.	Power Module no longer report fault and UGM determines motor temp ≤ 140°C (149-10°C) and Controls initialized. Drive disable reset when motor temp ≤ 139°C (149-10°C) and Drive Joystick in Neutral.
4233	REAR RIGHT MOTOR TOO HOT - PLEASE WAIT	The UGM determines that the drive motor temperature reported by the PM > 140°C but < 200°C or the PM determines that motor temperature sensor is reporting > 150°C UGM to suppress if DTCs 4229 is active.	Power Module no longer report fault and UGM determines motor temp ≤ 140°C (149-10°C) and Controls initialized. Drive disable reset when motor temp ≤ 139°C (149-10°C) and Drive Joystick in Neutral.
441	BATTERY VOLTAGE TOO LOW - SYSTEM SHUT-DOWN	The UGM detects that its 12V supply voltage is less than 9.0 volts for 5 seconds.	UGM voltage > 9.25V
442	BATTERY VOLTAGE TOO HIGH - SYSTEM SHUT-DOWN	The UGM detects that its 12V supply voltage > 16.0 volts	Power cycle
443	LSS BATTERY VOLTAGE TOO HIGH	The load sensor has determined that its supply voltage is too high (> 16V).  The machine will assume the platform is over-loaded.	Check for issue with sensor supply voltage.

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
444	LSS BATTERY VOLTAGE TOO LOW	The load sensor has determined that its supply voltage is too low (> 8V).  The machine will assume the platform is over-loaded.	Check for issue with sensor supply voltage.
4420	BATTERY DEEPLY DISCHARGED	UGM determines that the SOC% related to the Battery has reached the Deeply Discharged condition. Based on SOC% only, not Voltage threshold; No audible annunciation for this DTC.	Power cycle
4430	BATTERY VOLTAGE TOO LOW	UGM detects that its supply voltage < 11 volts for 5 seconds.	UGM voltage > 11.25V
4463	REAR LEFT MODULE - VOLTAGE OUT OF RANGE	Associated Power Module determines System Over-voltage/Undervoltage, Voltage measurement $\geq 65V$ or $\leq 12V$	Traction modules no longer report fault then controls initialized.
4464	REAR RIGHT MODULE - VOLTAGE OUT OF RANGE	Associated Power Module determines System Over-voltage/Undervoltage, Voltage measurement $\geq 65V$ or $\leq 12V$	Traction modules no longer report fault then controls initialized.
4479	LSS BATTERY VOLTAGE - INITIALIZATION ERROR	The shear beam is reporting a Sensor Supply Voltage Initialization Error  The machine will assume the platform is over-loaded.  This fault, once annunciated is latched within a given key cycle.	Possible sensor hardware issue.
4480	LSS BATTERY VOLTAGE - NOT CALIBRATED	The shear beam is reporting a Sensor Supply Voltage calibration error.  The machine will assume the platform is over-loaded.  This fault, once annunciated is latched within a given key cycle.	Possible sensor hardware issue.
4481	SYSTEM DC CURRENT - AT MAXIMUM	If $0^{\circ}F (-18^{\circ}C) < \text{Any Drive Motor Temp} < 10^{\circ}F (-12^{\circ}C)$ . Drive Motor Temp reported by TM. Temperature set-points in Constant Data. AND UGM determines that averaged SUM of DC Estimated Current from Traction Power Modules + Offset is > 800A for 500mSec	Currents return to levels below trigger level for same time period as trigger; UGM shall remove Creep speed restriction after controls initialized
4482	WHEEL DRIVE COMPONENTS - TOO COLD	If Any Drive Motor Temp < $0^{\circ}F (-18^{\circ}C)$ Drive Motor Temp reported by TM. Temperature set-point in Constant Data (same as low temp set-point above).	If All Drive Motor Temps > $10^{\circ}F (-12^{\circ}C)$ ; UGM shall remove Creep speed restriction after controls initialized

**Table 6-15. Diagnostic Trouble Codes**

<b>DTC</b>	<b>DTC Text</b>	<b>Fault Description</b>	<b>Solution</b>
4692	REAR LEFT BRAKE - SHORT TO GROUND OR OPEN CIRCUIT	Associated Power Module detects A4 shorted to ground: at Standby as or at Running (PWM Supplemental info not applicable to this DTC for initiating separate DTC: Power Module detects A4 shorted to ground at Startup as or Power Module detects A2 shorted to ground only at Startup, not detected in Standby or Running.	Power cycle
4693	REAR RIGHT BRAKE - SHORT TO GROUND OR OPEN CIRCUIT	Associated Power Module detects A4 shorted to ground: at Standby as or at Running (PWM Supplemental info not applicable to this DTC for initiating separate DTC: Power Module detects A4 shorted to ground at Startup as or Power Module detects A2 shorted to ground only at Startup, as not detected in Standby or Running.	Power cycle
46100	REAR LEFT BRAKE RETURN - SHORT TO BATTERY	Traction Module detects an overcurrent condition on pin A4, indicating a short between B+ and the Electric Brake FET	Power cycle
46130	MAIN CONTACTOR / REAR RIGHT BRAKE RETURN - SHORT TO BATTERY	At Startup, the Master Traction Module detects an overcurrent condition on pin A12, indicating a short between B+ and the Main Contactor. During active traction, the Master Traction Module detects an overcurrent condition on pin A4. Electric Brake FET	Power cycle
46104	REAR LEFT SPEED SENSOR - NOT RESPONDING PROPERLY	Associated Power Module has detected an encoder or directional sensing problem	Power cycle
46105	REAR RIGHT SPEED SENSOR - NOT RESPONDING PROPERLY	Associated Power Module has detected an encoder or directional sensing problem	Power cycle
46108	REAR LEFT SPEED SENSOR - RPM HIGH	Associated Power Module determines an overspeed condition (measured motor speed > DRIVE MAX + 15Hz) has occurred on a motor	Power cycle
46109	REAR RIGHT SPEED SENSOR - RPM HIGH	Associated Power Module determines an overspeed condition (measured motor speed > DRIVE MAX + 15Hz) has occurred on a motor	Power cycle
46136	REAR LEFT BRAKE SUPPLY VOLTAGE – OUT OF RANGE LOW	Associated Power Module determines that a low parking brake supply voltage condition exists.	Power cycle
46137	REAR RIGHT BRAKE SUPPLY VOLTAGE – OUT OF RANGE LOW	Associated Power Module determines that a low parking brake supply voltage condition exists.	Power cycle
46143	AWD FORWARD SOLENOID 1 - OPEN CIRCUIT	MACHINE SETUP ' MODEL = EC/H600 MACHINE SETUP ' WHEEL DRIVE = 4WD UGM detects an open circuit at the AWD forward (A) Solenoid	Power Cycle
46144	AWD FORWARD SOLENOID 1 - SHORT TO GROUND	UGM detects a short to ground at the AWD forward (A) Solenoid	Power Cycle
46145	AWD FORWARD SOLENOID 1 - SHORT TO BATTERY	UGM detects a short to battery at the AWD forward (A) Solenoid	Power Cycle
46146	AWD REVERSE SOLENOID 1 - OPEN CIRCUIT	UGM detects an open circuit at the AWD reverse (A) Solenoid	Power Cycle
46147	AWD REVERSE SOLENOID 1 - SHORT TO GROUND	UGM detects a short to ground at the AWD reverse (A) Solenoid	Power Cycle

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
46148	AWD REVERSE SOLENOID 1 - SHORT TO BATTERY	UGM detects a short to battery at the AWD reverse (A) Solenoid	Power Cycle
46149	AWD FORWARD SOLENOID 2 - OPEN CIRCUIT	UGM detects an open circuit at the AWD forward (B) Solenoid	Power Cycle
46150	AWD FORWARD SOLENOID 2 - SHORT TO GROUND	UGM detects a short to ground at the AWD forward (B) Solenoid	Power Cycle
46151	AWD FORWARD SOLENOID 2 - SHORT TO BATTERY	UGM detects a short to battery at the AWD forward (B) Solenoid	Power Cycle
46152	AWD REVERSE SOLENOID 2 - OPEN CIRCUIT	UGM detects an open circuit at the AWD reverse (B) Solenoid	Power Cycle
46153	AWD REVERSE SOLENOID 2 - SHORT TO GROUND	UGM detects a short to ground at the AWD reverse (B) Solenoid	Power Cycle
46154	AWD REVERSE SOLENOID 2 - SHORT TO BATTERY	UGM detects a short to battery at the AWD reverse (B) Solenoid	Power Cycle
662	CANBUS FAILURE - PLATFORM MODULE	UGM does not receive any CAN messages from Platform Module in 250ms	CAN1 messages are received from the PM and controls are initialized
663	CANBUS FAILURE - LOAD SENSING SYSTEM MODULE	The control system has lost communication with the load sensing system load pin.  The machine will assume the platform is overloaded.	Check wiring to load sensor.
6613	CANBUS FAILURE - EXCESSIVE CANBUS ERRORS	UGM observes more than 22 error frames per second for 4 seconds or more than 500 Buss Off conditions since last power cycle.	Power cycle
6635	CANBUS FAILURE - CHASSIS TILT SENSOR	UGM does not receive any CAN1 messages from Chassis Tilt Sensor in 250ms	CAN1 messages are received from the sensor and controls are initialized;
6654	CANBUS FAILURE - REAR LEFT MODULE	After Startup complete, Power Module CAN2 messages are not received in 200ms	UGM receives all traction modules CAN2 messages and shall command main contactor closed; once fault reset, motion permitted after controls are initialized. If CAN messages are lost more than 5 times, the fault shall be latched until Power Cycle.G352
6655	CANBUS FAILURE - REAR RIGHT MODUL	After Startup complete, UGM or Power Modules not receive the designated CAN messages in 200ms (250ms for UGM)	UGM receives all traction modules CAN2 messages and shall command main contactor closed; once fault reset, motion permitted after controls are initialized. If CAN messages are lost more than 5 times, the fault shall be latched until Power Cycle.
6657	CANBUS FAILURE - TEMPERATURE SENSOR	UGM determines that: • MACHINE SETUP → TEMP CUTOUT = YES • UGM does not receive any CAN1 messages from the Low Temperature Cutout sensor in 250ms Suppress DTCs 241 and 242 if this DTC is active.	UGM receives CAN1 messages from the Ambient Temperature sensor; speed restrictions removed after controls initialized
6683	CANBUS FAILURE - PLATFORM LIGHT PANEL	(Jumper Config Status > 1); UGM does not receive any CAN messages from the Platform Light Panel in 250ms	Not all of the trigger conditions are met.
7725	PUMP MOTOR - NOT RESPONDING	The Master Traction Module detects that the pump motor feedback is not responding when the pump is being commanded	Power cycle

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
7730	PUMP MOTOR OUTPUT - OUT OF RANGE HIGH	Master Traction Module detects that the pump motor voltage output is higher than expected (Pump V <sub>mn</sub> High; 29/MC Drive Open). Too high with respect to PWM applied.	Power cycle
7731	PUMP MOTOR OUTPUT - OUT OF RANGE LOW	Master Traction Module detects that the pump motor voltage output lower than expected. Too low with respect to PWM applied.	Power cycle
7737	PUMP MOTOR OVERLOADED	UGM detects that Pump Current reported by MTM > 210A for 3000ms (both Constant Data Values); MTM detects pump current > 220A	Currents return to levels below trigger level for same time period as trigger and controls initialized. UGM shall remove Drive Creep speed restriction after controls initialized
7753	REAR LEFT MOTOR STALLED	The UGM or Power Module(s) detects that the motor is stalled during active traction. For the UGM commanded speed ≥ Creep AND (RIGHT) +30 > Steer Angle < -45 (LEFT), the reported avg motor encoder feedback < 70 counts/s for 5 seconds (1.685 Hz). Avg motor encoder feedback evaluate on a 1s running average. For MTM, the encoder-measured motor speed < 0.6Hz for 5 seconds, when applied frequency > 1.5 Hz and Command > 10 Hz	UGM and Left Power Module shall clear the fault after drive joystick returns to neutral (and command returns to zero).
7754	REAR RIGHT MOTOR STALLED	The UGM or Power Module(s) detects that the motor is stalled during active traction. For the UGM commanded speed ≥ Creep AND (RIGHT) +30 > Steer Angle < -45 (LEFT), the reported avg motor encoder feedback < 70 counts/s for 5 seconds (1.685 Hz). Avg motor encoder feedback evaluate on a 1s running average. For MTM, the encoder-measured motor speed < 0.6Hz for 5 seconds, when applied frequency > 1.5 Hz and Command > 10 Hz	UGM and Right Power Module shall clear the fault after drive joystick returns to neutral (and command returns to zero)
7757	REAR LEFT MOTOR OUTPUT - OUT OF RANGE HIGH	Associated Power Module detects at Startup or during active traction that the motor voltage output is higher than expected	Power cycle
7758	REAR RIGHT MOTOR OUTPUT - OUT OF RANGE HIGH	Associated Power Module detects at Startup or during active traction that the motor voltage output is higher than expected	Power cycle
7761	REAR LEFT MOTOR OUTPUT - OUT OF RANGE LOW	Associated Power Module detects at Startup or during active traction that the motor voltage output is lower than expected	Power cycle
7762	REAR RIGHT MOTOR OUTPUT - OUT OF RANGE LOW	Associated Power Module detects at Startup or during active traction that the motor voltage output is lower than expected	Power cycle
7765	REAR LEFT MOTOR - FEEDBACK FAILURE	After main contactor is closed, Power Module detects that the motor voltage feedback circuits are damaged	Power cycle
7766	REAR RIGHT MOTOR - FEEDBACK FAILURE	After main contactor is closed, Power Module detects that the motor voltage feedback circuits are damaged	Power cycle

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
7769	REAR LEFT MOTOR - ROTATION OPPOSITE CONTROL	Associated Power Module detects that the motor is rotating in the direction opposite of the commanded direction and deceleration is less than 15% of deceleration personality setting for a period of more than 0.5 seconds	Power cycle
7770	REAR RIGHT MOTOR - ROTATION OPPOSITE CONTROL	Associated Power Module detects that the motor is rotating in the direction opposite of the commanded direction and deceleration is less than 15% of deceleration personality setting for a period of more than 0.5 seconds	Power cycle
7773	REAR LEFT MOTOR - OPEN CIRCUIT	When motor output is active, the Power Module detects that a motor phase is disconnected/open during active traction	Power cycle
7774	REAR RIGHT MOTOR - OPEN CIRCUIT	When motor output is active, the Power Module detects that a motor phase is disconnected/open during active traction	Power cycle
813	CHASSIS TILT SENSOR NOT CALIBRATED	UGM determines that tilt sensor, <ul style="list-style-type: none"> <li>has not been calibrated</li> <li>serial number does not match stored value</li> </ul> uninitialized sensor has been installed	Tilt sensor calibrated;
814	CHASSIS TILT SENSOR OUT OF RANGE	Fault CHASSIS TILT SENSOR NOT CALIBRATED (813) is not present and either of the external tilt sensor X or Y axis $\geq 35^\circ$ for 4 seconds. Not to be reported during Tilt Sensor calibration.	Not all of the trigger conditions are met;
818	TILT SENSOR STAGNANT	UGM shall consider the Tilt Sensor stagnant if neither the X-axis or Y-axis unfiltered reading change by $\geq \pm 0.05^\circ$ in 5000ms while the reported Drive speed $\geq$ Drive Creep Hz for all Traction modules	Power cycle;
821	LSS CELL #1 ERROR	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; The UGM detects that LSS is reporting error with Cell #1	Not all of the trigger conditions are met; motion restrictions removed after controls initialized
8211	LSS READING UNDERWEIGHT	LSS has been calibrated and the UGM has determined that the load sensing system reading is underweight while a period of time while operating drive or boom lift up at speeds greater than creep OR the UGM has determined that the load sensing system reading is less than -1.5 x Gross Platform Weight.  The machine will assume the platform is overloaded.  This fault, once annunciated is latched within a given key cycle.	Ensure platform is not resting on the ground or is not leveled at an extreme negative angle.  Re-calibrate the load sensing system if the above items are not a factor.

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
8218	LSS SENSOR DISAGREEMENT	<p>The control system has determined that the difference between the calculated load for sensor 1 and sensor 2 differ by more than 50lb OR the internal strain gauge sensor 1 gross platform weight reading and the internal strain gauge sensor 2 gross platform weight reading differ by more than 200lb</p> <p>If the platform is not considered to be overloaded boom functions will be restricted to creep.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	<p>Attempt to re-calibrate the load sensing system.</p> <p>Possible sensor hardware issue.</p>
822	LSS CELL #2 ERROR	<p>MACHINE SETUP -&gt; LOAD SYSTEM <math>\neq</math> NO; The UGM detects that LSS is reporting error with Cell #2</p>	<p>Not all of the trigger conditions are met; motion restrictions removed after controls initialized</p>
8222	LSS STRAIN GAUGE 1 - STAGNANT	<p>The control system has determined that the strain gauge 1 reading in the load sensor is stagnant (not changing).</p> <p>If the platform is not considered to be overloaded boom functions will be restricted to creep.</p> <p>If DTC 8223 is active in combination with DTC 8222 the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	<p>Possible sensor hardware issue.</p>
8223	LSS STRAIN GAUGE 2 - STAGNANT	<p>The control system has determined that the strain gauge 2 reading in the load sensor is stagnant (not changing).</p> <p>If the platform is not considered to be overloaded boom functions will be restricted to creep.</p> <p>If DTC 8222 is active in combination with DTC 8223 the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	<p>Possible sensor hardware issue.</p>
8224	LSS STRAIN GAUGE 1 - OUT OF RANGE LOW	<p>The shear beam is reporting an out of range low issue with the strain gauge 1 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8225 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	<p>Possible sensor hardware issue.</p>

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
8225	LSS STRAIN GAUGE2 - OUT OF RANGE LOW	<p>The shear beam is reporting an out of range low issue with the strain gauge 2 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8224 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8226	LSS STRAIN GAUGE1 - OUT OF RANGE HIGH	<p>The shear beam is reporting an out of range high issue with the strain gauge 1 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8227 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8227	LSS STRAIN GAUGE2 - OUT OF RANGE HIGH	<p>The shear beam is reporting an out of range high issue with the strain gauge 2 reading.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8226 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8228	LSS STRAIN GAUGE1 - INITIALIZATION ERROR	<p>The shear beam is reporting an initialization issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8229 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.



Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
8229	LSS STRAIN GAUGE2 - INITIALIZATION ERROR	<p>The shear beam is reporting an initialization issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8228 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8230	LSS STRAIN GAUGE1 - NOT CALIBRATED	<p>The shear beam is reporting a calibration issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8231 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
823	LSS CELL #3 ERROR	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; The UGM detects that LSS is reporting error with Cell #3	Not all of the trigger conditions are met; motion restrictions removed after controls initialized
8231	LSS STRAIN GAUGE2 - NOT CALIBRATED	<p>The shear beam is reporting a calibration issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8230 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8232	LSS STRAIN GAUGE1 - SENSOR DEFECT	<p>The shear beam is reporting a sensor defect issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8233 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
8233	LSS STRAIN GAUGE 2 - SENSOR DEFECT	<p>The shear beam is reporting a sensor defect issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8232 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8234	LSS STRAIN GAUGE 1 - NOT INSTALLED	<p>The shear beam is reporting a not installed issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8235 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8235	LSS STRAIN GAUGE 2 - NOT INSTALLED	<p>The shear beam is reporting a not installed issue with the strain gauge 2 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8234 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8236	LSS NOT DETECTING CHANGE	<p>The control system has determined that the load sensor reading has not deviated by more than 1lb for 5s while operating drive or boom functions at greater than creep speed.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.
8237	LSS STRAIN GAUGE 1 - A/D DEFECT	<p>The shear beam is reporting an internal issue with the strain gauge 1 sensor.</p> <p>If the platform is not overloaded the machine will be placed in to creep.</p> <p>If DTC 8238 is also active the machine will assume the platform is overloaded.</p> <p>This fault, once annunciated is latched within a given key cycle.</p>	Possible sensor hardware issue.

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
8238	LSS STRAIN GAUGE2 - A/D DEFECT	The shear beam is reporting an internal issue with the strain gauge 2 sensor.  If the platform is not overloaded the machine will be placed in to creep.  If DTC 8237 is also active the machine will assume the platform is overloaded.  This fault, once announced is latched within a given key cycle.	Possible sensor hardware issue.
824	LSS CELL #4 ERROR	MACHINE SETUP -> LOAD SYSTEM ≠ NO; The UGM detects that LSS is reporting error with Cell #4	Not all of the trigger conditions are met; motion restrictions removed after controls initialized
825	LSS HAS NOT BEEN CALIBRATED	MACHINE SETUP -> LOAD SYSTEM ≠ NO The load sensor has not been calibrated, or DTC 992 (LSS EEPROM ERROR) is active, or DTC 9977 (LSS CORRUPT EEPROM) is active	Not all of the trigger conditions are met
826	RUNNING AT CREEP - PLATFORM OVERLOADED	MACHINE SETUP -> LOAD SYSTEM = WARN ONLY; The platform is Overloaded;	UGM determines that the Platform is not Overloaded; motion restrictions removed after controls initialized
829	FUNCTIONS CUTOUT - PLATFORM OVERLOADED	The Platform is Overloaded and MACHINE SETUP -> LOAD SYSTEM = CUTOUT PLATFORM, Platform Mode is active, and conditions of LSS section apply. -or- The Platform is Overloaded and MACHINE SETUP -> LOAD SYSTEM = CUTOUT ALL and conditions of LSS section apply	UGM determines that the Platform is not Overloaded; motion restrictions removed after controls initialized
8664	STEER SENSOR - OUT OF RANGE HIGH	The UGM observes the Master Traction Module reported steer raw voltage signal $\geq 4.5V$ (Constant Data)	UGM observes steer voltage within calibrated range for 1000ms; Drive Creep restriction lifted after fault clears and controls initialized
8665	STEER SENSOR - OUT OF RANGE LOW	The UGM observes the Master Traction Module reported steer raw voltage signal $\leq 0.3V$ (Constant Data)	UGM observes steer angle voltage within calibrated range for 1000ms; Drive Creep restriction lifted after fault clears and controls initialized
8666	STEER SENSOR - DECOUPLED	The UGM observes the Master Traction Module reported steer raw voltage $0.3V < \text{signal} < 0.5V$ (Constant Data)	UGM determines steer angle within allowed range; Drive Creep restriction removed after fault clears and controls initialized;
8667	STEER SENSOR - NOT RESPONDING	The UGM determines that the Master Traction Module reported Machine Steer Angle does not change $\geq 1.0^\circ$ in 4000ms while the steering output is being commanded while steer is calibrated and properly reported by MTM in range that is not within 3deg of calibrated MAX.	UGM determines steer angle changes more than trigger amount while in allowed evaluation range; Drive Creep restriction removed after fault clears and controls initialized
8668	STEER SENSOR - NOT CALIBRATED	UGM determines that the steering sensor has not been calibrated; UGM EEPROM values are default, do not match MTM, or UGM fails to successfully read from 0x212, 0x213, or 0x214 three times during Startup	UGM determines that sensor is calibrated
8692	OSCILLATING AXLE CHARGE SOLENOID - SHORT TO GROUND	UGM detects a short to ground on oscillating axle charge solenoid output	Power cycle

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
8693	OSCILLATING AXLE CHARGE SOLENOID - SHORT TO BATTERY	UGM detects a short to battery on oscillating axle charge solenoid output	Power cycle; Drive re-enable when below elevation and controls initialized
8694	OSCILLATING AXLE CHARGE SOLENOID - OPEN CIRCUIT	UGM detects an open circuit on oscillating axle charge solenoid output	Power cycle
873	MACHINE SAFETY SYSTEM OVERRIDE OCCURRED	UGM determines that an MSSO has occurred	Fault shall be considered active and retained through power cycle; reset only via Analyzer/Calibrations
991	LSS WATCHDOG RESET	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; UGM detects LSS report of an anomaly exists that has caused a WatchDog Timer reset.	Power cycle
992	LSS EEPROM ERROR	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; UGM detects LSS report of an anomaly that exists in the LSS EEPROM	Power cycle
993	LSS INTERNAL ERROR - PIN EXCITATION	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; UGM detects LSS report of improper excitation voltage	Power cycle
994	LSS INTERNAL ERROR - DRDY MISSING FROM A/D	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; UGM detects LSS report of an anomaly that exists in the LSS A/D converter operations.	Power cycle
998	EEPROM FAILURE - CHECK ALL SETTINGS	The UGM has detected an anomaly in EEPROM that can not be auto-corrected from the backup EEPROM bank.	Power cycle
9910	FUNCTIONS LOCKED OUT - PLATFORM MODULE SOFTWARE VERSION IMPROPER	The UGM software version type is 'P' The UGM has received valid version information from the PM. The PM software version type is 'P' The UGM software major version number does not match the major version number of the platform software	Not all of the trigger conditions are met
9911	FUNCTIONS LOCKED OUT	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO; The UGM determines that the LSS software version is not compatible with existing code per the referenced Software Version Compatibility table.	Power cycle
9919	GROUND SENSOR REF VOLTAGE OUT OF RANGE	The UGM has detected reference voltage is out of range: $2.3V < \text{Reference Voltage} < 2.7V$ (debounced for 100ms)	Power cycle
9920	PLATFORM SENSOR REF VOLTAGE OUT OF RANGE	The UGM detects that its reference voltage being reported by PM out of range ( $4.8V < \text{voltage} < 5.2V$ ); debounced for 100ms	Power cycle
9921	GROUND MODULE FAILURE - HIGH SIDE DRIVER CUTOUT FAULTY	The UGM footswitch input J7-15 is LOW	Power cycle
9922	PLATFORM MODULE FAILURE - HWFS CODE 1	The PM detects that its V(low) FET has failed and reports this fault to the UGM	Power cycle
9924	FUNCTIONS LOCKED OUT - MACHINE NOT CONFIGURED	The machine is powered up and no model has been selected yet in the MACHINE SETUP menu	Power cycle

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
9927	GROUND MODULE CONSTANT DATA UPDATE REQUIRED	The UGM detects one of the following conditions when software type is 'P' or 'B': The Version Verification Word #1 or the Version Verification Word #2 values located in the constant data sector of flash memory (found on constant data spreadsheet tab pstConstantDataVersion) do not match the values located in the code area of flash memory. The Version Major value located in the constant data sector of flash memory (found on constant data spreadsheet tab pstConstantDataVersion) does not match the value located in the code area of flash memory.	A different application code or constant data version is programmed so that the values match; Power cycled
9944	CURRENT FEEDBACK GAINS OUT OF RANGE	One or more of the current feedback gains that are calculated and written to flash memory during the JDES manufacturing test process are detected as being out of range	Power cycle
9945	CURRENT FEEDBACK CALIBRATION CHECKSUM INCORRECT	The current feedback gains checksum that is calculated and written to flash memory during the JDES manufacturing test process is detected as being incorrect	Power cycle
9949	MACHINE CONFIGURATION OUT OF RANGE - CHECK ALL SETTINGS	UGM has detected an anomaly in EEPROM with regard to the Machine Setup configuration.	Power cycle
9977	LSS CORRUPT EEPROM	MACHINE SETUP -> LOAD SYSTEM $\neq$ NO and one of the following conditions: UGM determines LSS-stored values for Unloaded weight in Indirect 0x100 $\neq$ 0x108 or UGM determines LSS-stored values for Accessory weight in Indirect 0x102 $\neq$ 0x10A; UGM determines LSS-stored checksum1 (0x10F) $\neq$ checksum 2 (0x107)	Power cycle
9979	FUNCTIONS LOCKED OUT - GROUND MODULE SOFTWARE VERSION IMPROPER	Ground software has been installed on a UGM with a ST10F274 processor (Hardware Rev < 6), which does not have guaranteed flash storage in the sector where Constant Data is written.	Power cycle
9986	GROUND MODULE VLOW FET FAILURE	VLow FET determined to be failed on Startup; UGM unable to read high-sensing inputs.	Power cycle
99167	PUMP COMMAND ERROR	Master Traction Module determines that an inconsistency has occurred between the Pump Enable bits and the Pump commands; Pump enable bit = set, but Pump Command = 0	Power cycle
99234	REAR LEFT MODULE - EEPROM FAILURE	Applicable Power Module determines at Startup that an internal EEPROM error exists or UGM fails to successfully verify or write to/read back Indirect Table three times	Power cycle
99235	REAR LEFT MODULE - PROTECTION FAILURE	Applicable Power Module determines that an internal failure exists in the hardware protection circuit	Power cycle
99236	REAR LEFT MODULE - CHECK POWER CIRCUITS OR MOSFET SHORT CIRCUIT	Applicable Power Module determines at Startup that a short circuit exists on the power MOSFET outputs	Power cycle
99237	REAR LEFT MODULE - WATCHDOG RESET	Applicable Power Module determines that Watchdog failure/reset has occurred to one if two, or both	Power cycle
99238	REAR LEFT MODULE - WATCHDOG2 RESET	Applicable Power Module determines that Watchdog2 failure/reset has occurred	Power cycle

Table 6-15. Diagnostic Trouble Codes

DTC	DTC Text	Fault Description	Solution
99239	REAR LEFT MODULE - RAM FAILURE	Applicable Power Module determines that a RAM checksum error has occurred	Power cycle
99240	REAR LEFT MODULE - INTERNAL ERROR	Applicable Power Module determines at Startup that the current gain is incorrect and may cause incorrect data acquisition values	Power cycle
99241	REAR LEFT MODULE - INTERNAL ERROR	Applicable Power Module determines that the data acquisition is in error	Power cycle
99242	REAR LEFT MODULE - INTERNAL ERROR	Applicable Power Module determines that the Pump current is being measured is not zero when expected to be zero at Startup or during standby	Power cycle
99243	REAR LEFT MODULE - INTERNAL ERROR	Applicable Power Module determines that the Slip Profile is in error	Power cycle
99244	REAR LEFT MODULE - INTERNAL ERROR	Applicable Power Module determines that the current feedbacks are out of range at Startup or when in standby	Power cycle
99245	REAR LEFT MODULE - INTERNAL ERROR	Applicable Power Module determines at Startup that there is a problem with overvoltage/undervoltage detection	Power cycle
99246	REAR LEFT MODULE - CAPACITOR BANK FAULT	The power capacitor bank of the Power Module is not charging properly (increasing voltage) at Startup	Power cycle
99247	REAR LEFT MODULE - A/D FAILURE	Applicable Power Module determines that an internal Analog Input error exists	Power cycle
99248	REAR RIGHT MODULE - EEPROM FAILURE	Applicable Power Module determines at Startup that an internal EEPROM error exists or UGM fails to successfully verify or write to/read back Indirect Table three times	Power cycle
99249	REAR RIGHT MODULE - PROTECTION FAILURE	Applicable Power Module determines that an internal failure exists in the hardware protection circuit	Power cycle
99250	REAR RIGHT MODULE - CHECK POWER CIRCUITS OR MOSFET SHORT CIRCUIT	Applicable Power Module determines at Startup that a short circuit exists on the power MOSFET outputs	Power cycle
99251	REAR RIGHT MODULE - WATCHDOG RESET	Applicable Power Module determines that Watchdog failure/reset has occurred to one if two, or both	Power cycle
99252	REAR RIGHT MODULE - WATCHDOG2 RESET	Applicable Power Module determines that Watchdog 2 failure/reset has occurred	Power cycle
99253	REAR RIGHT MODULE - RAM FAILURE	Applicable Power Module determines that a RAM checksum error has occurred	Power cycle
99254	REAR RIGHT MODULE - INTERNAL ERROR	Applicable Power Module determines at Startup that the current gain is incorrect and may cause incorrect data acquisition values	Power cycle
99255	REAR RIGHT MODULE - INTERNAL ERROR	Applicable Power Module determines that the data acquisition is in error	Power cycle
99256	REAR RIGHT MODULE - INTERNAL ERROR	Applicable Power Module determines that the Pump current is being measured is not zero when expected to be zero at Startup or during standby	Power cycle
99257	REAR RIGHT MODULE - INTERNAL ERROR	Applicable Power Module determines that the Slip Profile is in error	Power cycle

**Table 6-15. Diagnostic Trouble Codes**

<b>DTC</b>	<b>DTC Text</b>	<b>Fault Description</b>	<b>Solution</b>
99258	REAR RIGHT MODULE - INTERNAL ERROR	Applicable Power Module determines that the current feedbacks are out of range at Startup or when in standby	Power cycle
99259	REAR RIGHT MODULE - INTERNAL ERROR	Applicable Power Module determines at Startup that there is a problem with overvoltage/undervoltage detection	Power cycle
99260	REAR RIGHT MODULE - CAPACITOR BANK FAULT	The power capacitor bank of the Power Module is not charging properly (increasing voltage) at Startup	Power cycle
99261	REAR RIGHT MODULE - A/D FAILURE	Applicable Power Module determines that an internal Analog Input error exists	Power cycle
99264	REAR LEFT MODULE - CURRENT MEASUREMENT ERROR	Power Module determines at when traction is active that the current feedback sensors are out of the permitted range and may cause incorrect data acquisition values	Power cycle
99265	REAR RIGHT MODULE - CURRENT MEASUREMENT ERROR	Power Module determines at when traction is active that the current feedback sensors are out of the permitted range and may cause incorrect data acquisition values	Power cycle
99270	REAR RIGHT MODULE - DRIVE COMMAND ERROR	Power Modules determine that an inconsistency has occurred between the Drive direction/enable bits and Drive magnitude/direction command	Power cycle
99269	REAR LEFT MODULE - DRIVE COMMAND ERROR	Power Modules determine that an inconsistency has occurred between the Drive direction/enable bits and Drive magnitude/direction command	Power cycle
99273	FUNCTIONS LOCKED OUT – REAR LEFT MODULE SOFTWARE VERSION IMPROPER	The UGM software version type is 'P' The UGM has received valid version information from all Power Modules. The Power Module major version number is not compliant with the version specified on the Software section of this document.	Not all of the trigger conditions are met
99274	FUNCTIONS LOCKED OUT – REAR RIGHT MODULE SOFTWARE VERSION IMPROPER	The UGM software version type is 'P' The UGM has received valid version information from all Power Modules. The Power Module major version number is not compliant with the version specified on the Software section of this document.	Not all of the trigger conditions are met
99281	FUNCTIONS LOCKED OUT - IMPROPER MOTOR PARAMETERS	The UGM determines an incorrect protected Indirect Table value at start-up	Power cycle
99285	LSS - FACTORY CALIBRATION ERROR	The load sensor is reporting a factor calibration issue (internal error)  The machine will assume the platform is overloaded.  This fault, once annunciated is latched within a given key cycle.	Possible sensor hardware issue.
99286	TRACTION MODULE - MOTOR PARAMETERS NOT CALIBRATED	The UGM determines during startup that the EC/H600 motor parameters are not loaded into the Traction Module. [MACHINE SETUP = EC/H600]	EC/H600 Motor parameters have been written to the Traction Modules



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## SECTION 7. BASIC ELECTRICAL INFORMATION & SCHEMATICS

### 7.1 GENERAL

This section contains basic electrical information and schematics to be used for locating and correcting most of the operating problems which may develop. If a problem should develop which is not presented in this section or which is not corrected by listed corrective actions, technically qualified guidance should be obtained before proceeding with any maintenance.

**NOTE:** Some of the procedures/connectors shown in this section may not be applicable to all models.

### 7.2 MULTIMETER BASICS

A wide variety of multimeter's or Volt Ohm Meters (VOM) can be used for troubleshooting your equipment. This section shows diagrams of a common, digital VOM configured for several different circuit measurements. Instructions for your VOM may vary. Please consult the meter operator's manual for more information.

#### Grounding

"Grounding the meter" means to take the black lead (which is connected to the COM (common) or negative port) and touch it to a good path to the negative side of the Voltage source.

#### Backprobing

To "backprobe" means to take the measurement by accessing a connector's contact on the same side as the wires, the back of the connector. Readings can be done while maintaining circuit continuity this way. If the connector is the sealed type, great care must be taken to avoid damaging the seal around the wire. It is best to use probes or probe tips specifically designed for this technique, especially on sealed connectors. Whenever possible insert probes into the side of the connector such that the test also checks both terminals of the connection. It is possible to inspect a connection within a closed connector by backprobing both sides of a connector terminal and measuring resistance. Do this after giving each wire a gentle pull to ensure the wires are still attached to the contact and contacts are seated in the connector.

#### Min/Max

Use of the "Min/Max" recording feature of some meters can help when taking measurements of intermittent conditions while alone. For example, you can read the Voltage applied to a solenoid when it is only operational while a switch, far from the solenoid and meter, is held down.

#### Polarity

Getting a negative Voltage or current reading when expecting a positive reading frequently means the leads are reversed. Check what reading is expected, the location of the signal and that the leads are connected to the device under test correctly. Also check that the lead on the "COM" port goes to the Ground or negative side of the signal and the lead on the other port goes to the positive side of the signal.

#### Scale

M = Mega = 1,000,000 \* (Displayed Number)

k = kilo = 1,000 \* (Displayed Number)

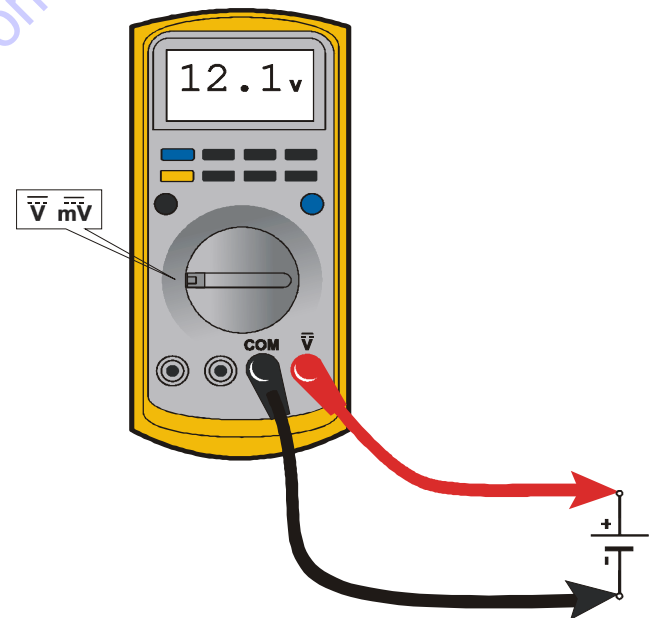
m = milli = (Displayed Number) / 1,000

$\mu$  = micro = (Displayed Number) / 1,000,000

Example: 1.2 kW = 1200 W

Example: 50 mA = 0.05 A

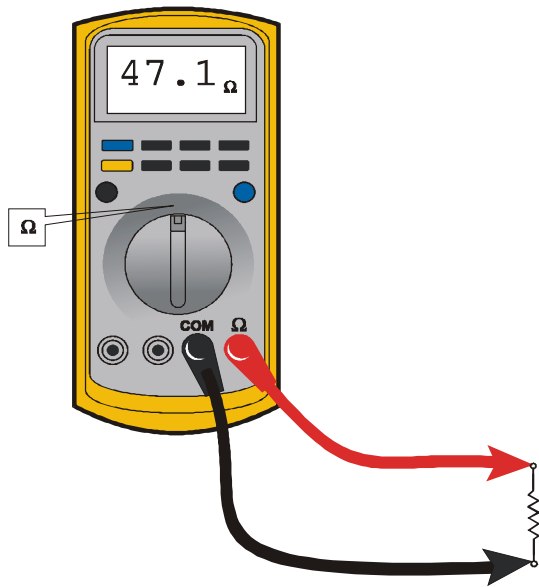
#### Voltage Measurement



**Figure 7-1. Voltage Measurement (DC)**

- If meter is not auto ranging, set it to the correct range (See multimeter's operation manual).
- Use firm contact with meter leads.

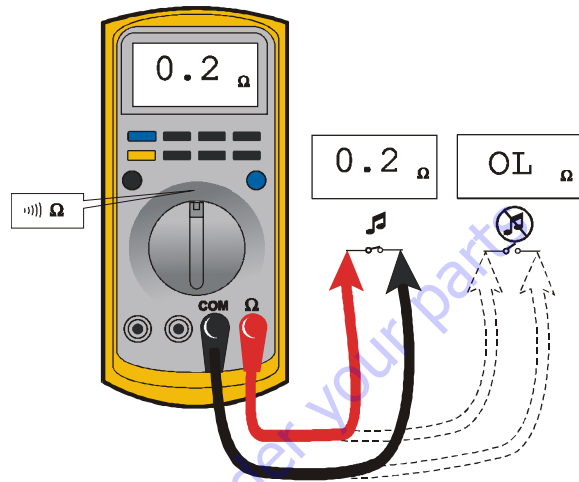
### Resistance Measurement



**Figure 7-2. Resistance Measurement**

- First test meter and leads by touching leads together. Resistance should read a short circuit (very low resistance).
- Circuit power must be turned OFF before testing resistance.
- Disconnect component from circuit before testing.
- If meter is not auto ranging, set it to the correct range (See multimeter's operation manual).
- Use firm contact with meter leads.

### Continuity Measurement



**Figure 7-3. Continuity Measurement**

- Some meters require a separate button press to enable audible continuity testing.
- Circuit power must be turned OFF before testing continuity.
- Disconnect component from circuit before testing.
- Use firm contact with meter leads.
- First test meter and leads by touching leads together. Meter should produce an audible alarm, indicating continuity.

## Current Measurement

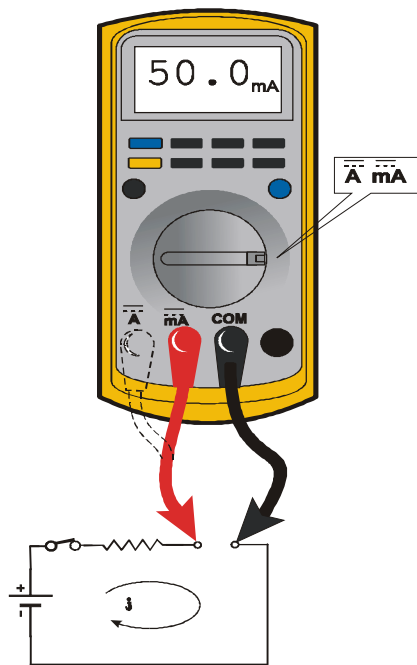


Figure 7-4. Current Measurement (DC)

- Set up the meter for the expected current range.
- Be sure to connect the meter leads to the correct jacks for the current range you have selected.
- If meter is not auto ranging, set it to the correct range (See multi meter's operation manual).
- Use firm contact with meter leads.

## 7.3 CHECKING SWITCHES

### Basic Check

The following check determines if the switch is functioning properly, not the circuit in which the switch is placed. A switch is functioning properly when there is continuity between the correct terminals or contacts only when selected.

1. De-energize the circuit.
2. Isolate the switch from the rest of the circuit if possible. If not possible, keep in mind it may affect readings.
3. Access the terminals to the switch.
4. If the switch has two terminals:
  - a. Measure resistance across the terminals.
  - b. Change the switch position.
  - c. Measure resistance again with the leads in the same positions. If the meter was reading short, it should read an open. If the meter was reading open it should read short.
5. If the switch has more than two terminals, consult the schematic or switch diagram to determine what terminals will be connected. The test is similar to testing a switch with two terminals.
  - a. Place one meter lead on the common contact and the other on a different contact in the same circuit.
  - b. Cycle through all positions of the switch. The meter should read short only when the switch connects the two terminals and open otherwise.
  - c. If the switch has more than one common contact repeat the process for that circuit.

### Limit Switches

Limit switches are used to control movement or indicate position. Mechanical limit switches are just like manually operated switches except that the moving object operates the switch. These switches can be tested the same way as a standard switch by manually operating the sensing arm.

Another type of limit switch used by JLG is the inductive proximity switch, also referred to as a "prox switch". Inductive proximity switches are actuated only by ferrous metal (metal that contains Iron, such as steel) near the switch. They do not require contact, and must be energized to actuate. These types of switches can be used to detect boom or platform position, for example. These switches have a sensing face where the switch can detect ferrous metal close to it. To find the sensing face, take note how the switch is mounted and how the mechanisms meet the switch. Test this type of switch as follows:

1. Remove proximity switch from its mount.
2. Reconnect harness if it was disconnected for step a, and turn on machine.
3. Hold switch away from metal and observe switch state in the control system diagnostics using the Analyzer. See vehicle or control system documentation on how to do this.
4. Place sensing face of switch on the object to be sensed by the switch. If that is not available, use a piece of ferrous metal physically similar to it. The switch state in the control system diagnostics should change.
5. When reinstalling or replacing switch be sure to follow mounting instructions and properly set the gap between the switch and object sensed.

### Automatic Switches

If the switch is actuated automatically, by temperature or pressure for example, find a way to manually actuate the switch to test it. Do this either by applying heat or pressure, for example, to the switch. These switches may need to be energized to actuate.

1. Connect instrumentation to monitor and/or control the parameter the switch is measuring.
2. Observe switch state in control system with the Analyzer. See vehicle or control system documentation on how to do this.
3. Operate system such that the switch actuates. This could be going over a certain pressure or temperature, for example. The state indicated in the control system should change.

### Switch Wiring - Low Side, High Side

When controlling a load, a switch can be wired between the positive side of the power source and the load. This switch is called a "high side" switch. The switch supplies the power to the load. When a switch is wired between the negative side of the power source and the load, it is a "low side" switch. The switch provides the ground to the load.

A low side switch will allow voltage to be present on the load. No power is applied because the switch is stopping current flow. This voltage can be seen if the measurement is taken with one test lead on the load and the other on the battery negative side or grounded to the vehicle. What is actually being measured is the voltage drop across the switch. This could mislead a technician into thinking the load is receiving power but not operating. To produce an accurate picture of power or voltage applied to the load, measure voltage across the load's power terminals. Also, the technician can measure the voltage at both power terminals with respect to battery ground. Measurements is the voltage applied to the load.

### 7.4 APPLYING SILICONE DIELECTRIC COMPOUND TO ELECTRICAL CONNECTIONS

**NOTE:** This section is not applicable for battery terminals.

#### NOTICE

**JLG PN 0100048 DIELECTRIC GREASE (NOVAGARD G661) IS THE ONLY MATERIAL APPROVED FOR USE AS A DIELECTRIC GREASE.**

**NOTE:** Do NOT apply dielectric grease to the following connections:

- Main Boom Rotary sensor connections (on Celesco Sensor),
- LSS Modules connections.
- Deutz EMR 2 ECM connection.

Silicone Dielectric Compound must be used on all electrical connections except for those mentioned above 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. This procedure applies to all plug connections not enclosed in a box. Silicone grease should not be applied to connectors with external seals.

1. To prevent oxidation, silicone grease must be packed completely around male and female pins on the inside of the connector prior to assembly. This is most easily achieved by using a syringe.

**NOTE:** Over a period of time, oxidation increases electrical resistance at the connection, eventually causing circuit failure.

2. To prevent shorting, silicone grease must be packed around each wire where they enter the outside of the connector housing. Also, silicone grease must be applied at the joint where the male and female connectors come together. Any other joints (around strain reliefs, etc.) where water could enter the connector should also be sealed.

#### NOTICE

**THIS CONDITION IS ESPECIALLY COMMON WHEN MACHINES ARE PRESSURE WASHED SINCE THE WASHING SOLUTION IS MUCH MORE CONDUCTIVE THAN WATER.**

3. Anderson connectors for the battery boxes and battery chargers should have silicone grease applied to the contacts only.

**NOTE:** *Curing-type sealants might also be used to prevent shorting and would be less messy, but would make future pin removal more difficult.*

When applied to electrical connections, dielectric grease helps to prevent corrosion of electrical contacts and improper conductivity between contacts from moisture intrusion. Open and sealed connectors benefit from the application of dielectric grease.

Dielectric grease shall be applied to all electrical connectors at the time of connection (except those noted under Exclusions).

### 7.5 DIELECTRIC GREASE APPLICATION

Dielectric grease helps to prevent corrosion of electrical contacts and improper conductivity between contacts from moisture intrusion. Non-waterproof connectors benefit from the application of dielectric grease.

#### Installation

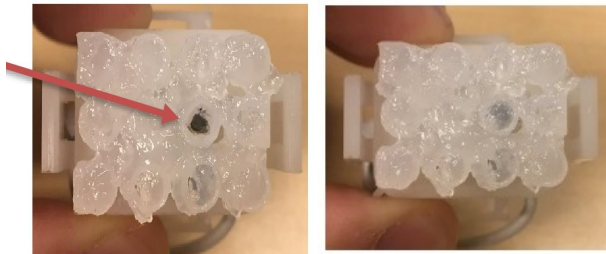
The following is general guidance for the installation of dielectric grease in a connector system.

- Use dielectric grease in a tube for larger connection points or apply with a syringe for small connectors.
- Apply dielectric grease to plug/male connector housing which typically contains sockets contact/female terminals.
- Leave a layer of dielectric grease on the mating face of the connector, completely covering each connector terminal hole. Refer the pictures shown below.
- Assemble the connector system immediately to prevent moisture ingress or dust contamination.

The following connector systems are specifically addressed because of their widespread use at JLG. However, this guidance may be applied to similar devices.

#### AMP Mate-N-Lok

This connector system is widely used inside enclosures for general-purpose interconnect. Follow the general guidance for installation.



Improper

Proper

#### AMP Faston

This connector system is typically used on operator switches at JLG. Follow the general guidance for installation.

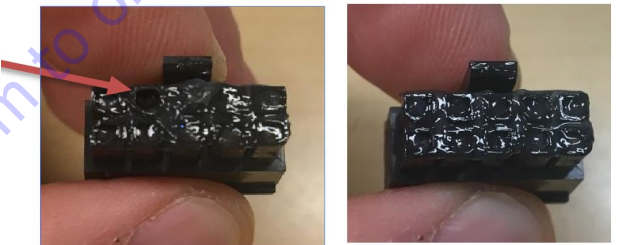


Improper

Proper

#### AMP Micro-Fit

This connector system is typically used on control modules at JLG. Follow the general guidance for installation.



Improper

Proper

### AMP Mini Fit Jr

This connector system is typically used on control modules at JLG. Follow the general guidance for installation.



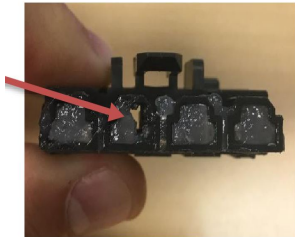
Improper



Proper

### Mini Fit Sr

This connector system is typically used on control modules at JLG. Follow the general guidance for installation.



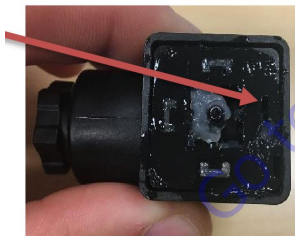
Improper



Proper

### DIN Connectors

This connector is typically used on hydraulic valves. Follow the installation instructions



Improper



Proper

### Exceptions

Some waterproof connector applications do benefit from dielectric grease, and some non waterproof connectors do not benefit from dielectric grease.

In the exceptions below, we have found dielectric grease is not needed for some applications, and in some cases can interfere with the intended connection. Dielectric grease shall be used as an exception in other applications.

### Enclosures

Application of dielectric grease is not required in properly sealed enclosures. To meet criteria, the enclosure must be rated to at least IP56 (dust protected; protected from powerful jets of water).

### Carling Switch Connectors

Carling switches may experience high impedance, or discontinuity, due to silicone dielectric grease ingress when switching inductive loads. Therefore, dielectric grease shall not be applied to Carling switch mating connectors unless specifically noted.



## 7.6 AMP CONNECTOR

### 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.

### Assembly

Check to be sure the wedge lock is in the open, or as-shipped, position (See Figure 7-5.). Proceed as follows:

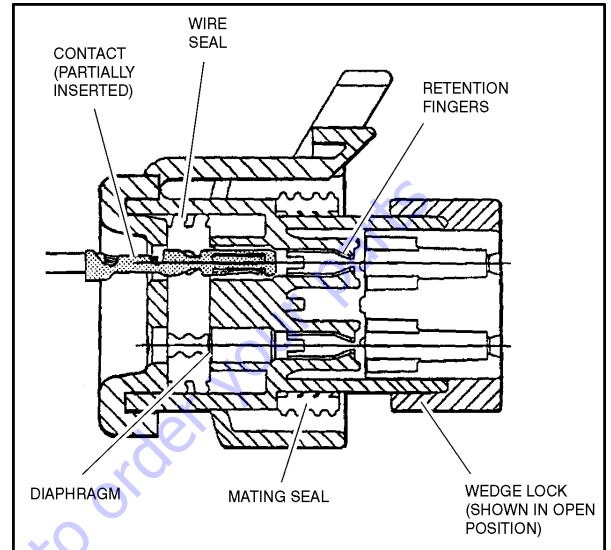


Figure 7-5. Connector Assembly Figure 1

1. To insert a contact, push it straight into the appropriate circuit cavity as far as it will go (See Figure 7-7.).
2. Pull back on the contact wire with a force of 1 or 2 lb to be sure the retention fingers are holding the contact (See Figure 7-7.).

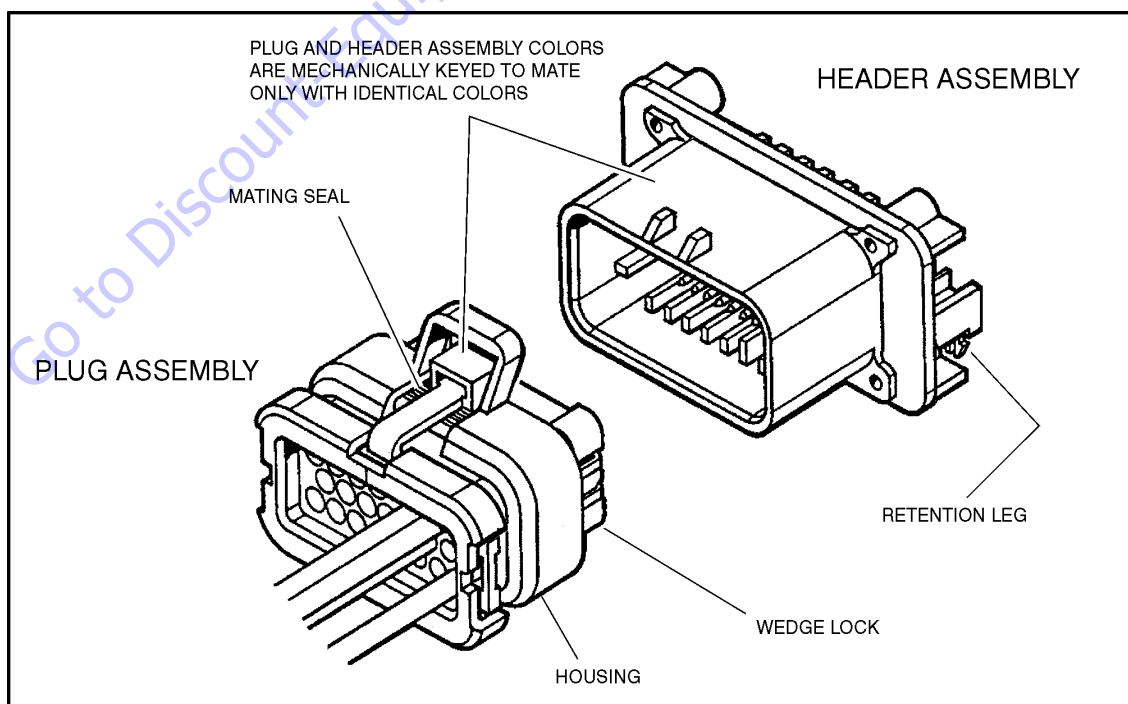


Figure 7-6. AMP Connector

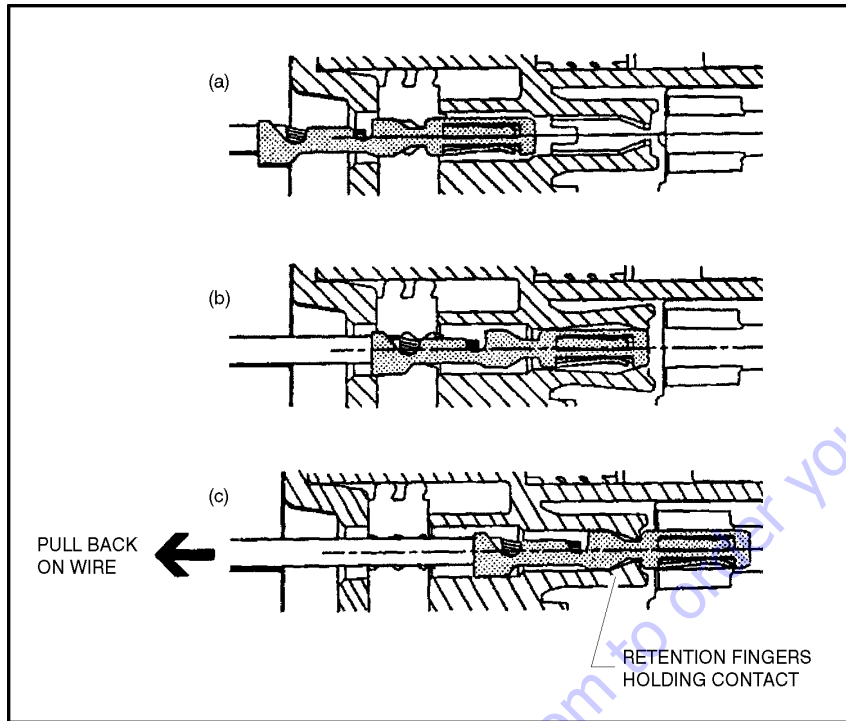


Figure 7-7. Connector Assembly Figure 2

3. After all required contacts have been inserted, the wedge lock must be closed to its locked position. Release the locking latches by squeezing them inward (See Figure 7-8).

4. Slide the wedge lock into the housing until it is flush with the housing (See Figure 7-9).

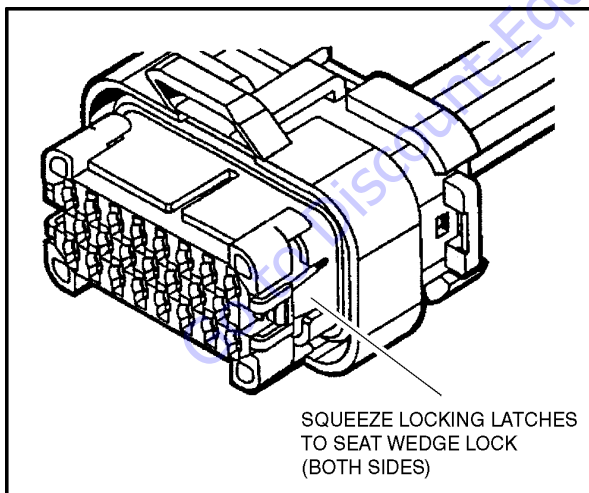


Figure 7-8. Connector Assembly Figure 3

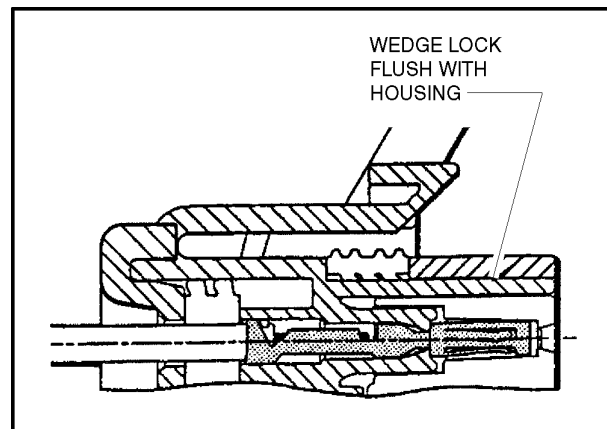


Figure 7-9. Connector Assembly Figure 4



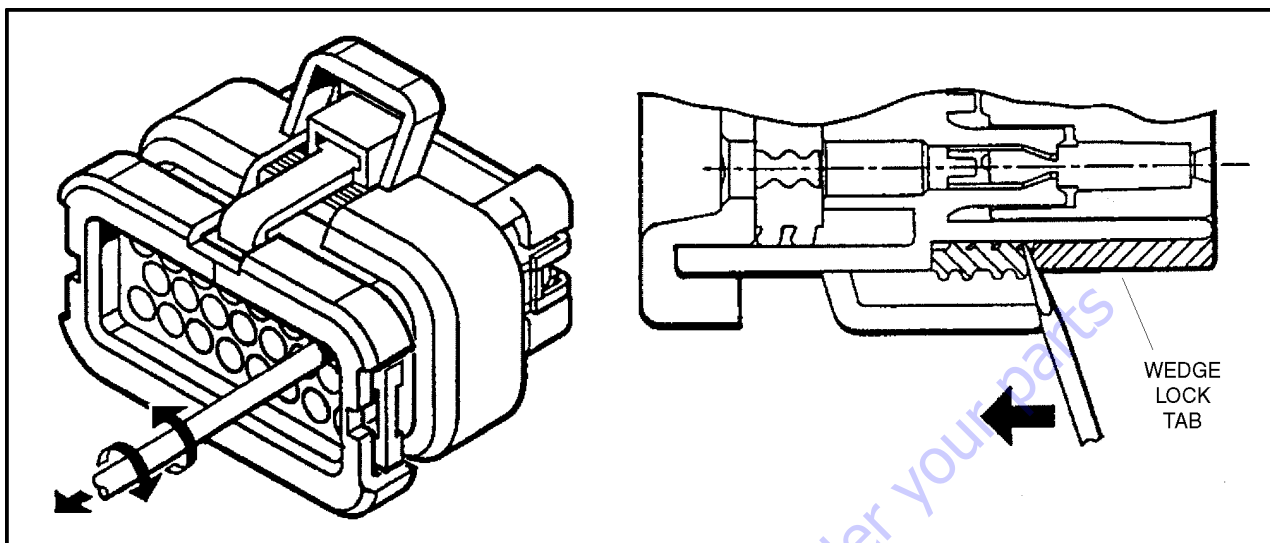


Figure 7-10. Connector Disassembly

### Disassembly

1. Insert a 4.8 mm (3/16") wide screwdriver blade between the mating seal and one of the red wedge lock tabs.
2. Pry open the wedge lock to the open position.
3. While rotating the wire back and forth over a half turn (1/4 turn in each direction), gently pull the wire until the contact is removed.

**NOTE:** The wedge lock should never be removed from the housing for insertion or removal of the contacts.

### Wedge Lock

The wedge lock has slotted openings in the forward, or mating end. These slots accommodate circuit testing in the field, by using a flat probe such as a pocket knife. DO NOT use a sharp point such as an ice pick.

### Service - Voltage Reading

#### **NOTICE**

**DO NOT PIERCE WIRE INSULATION TO TAKE VOLTAGE READINGS.**

It has been common practice in electrical troubleshooting to probe wires by piercing the insulation with a sharp point. This practice should be discouraged when dealing with the AMP-SEAL plug assembly, or any other sealed connector system. The resulting pinholes in the insulation will allow moisture to invade the system by traveling along the wire strands. This nullifies the effectiveness of the connector seals and could result in system failure.

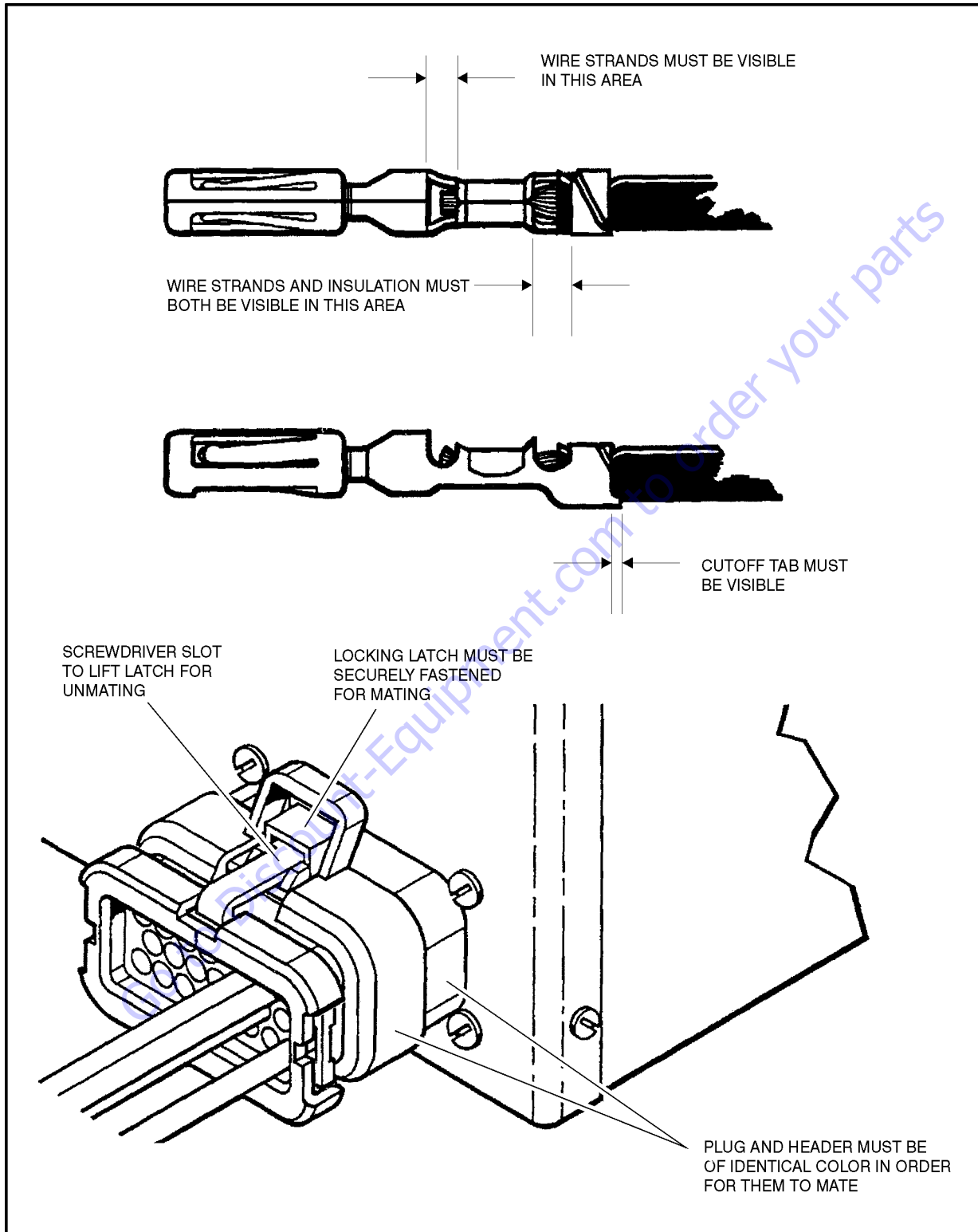


Figure 7-11. Connector Installation

## 7.7 DEUTSCH CONNECTORS

### DT/DTP Series Assembly

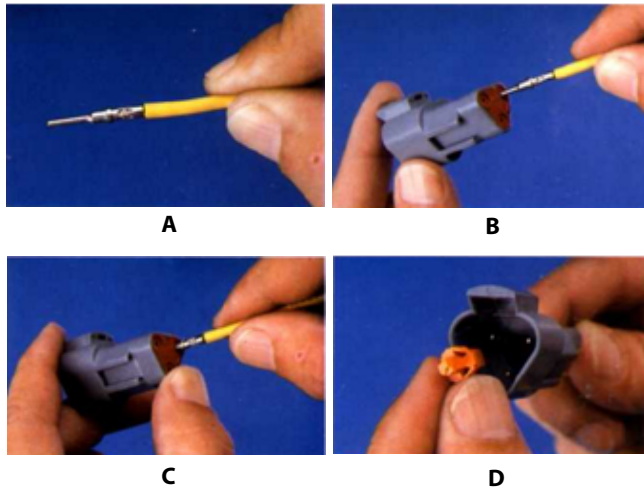


Figure 7-12. DT/DTP Contact Installation

1. Grasp crimped contact about 25mm behind the contact barrel.
2. Hold connector with rear grommet facing you.
3. Push contact straight into connector grommet until a click is felt. A slight tug will confirm that it is properly locked in place.
4. Once all contacts are in place, insert wedgelock with arrow pointing toward exterior locking mechanism. The wedgelock will snap into place. Rectangular wedges are not oriented. They may go in either way.

**NOTE:** The receptacle is shown - use the same procedure for plug.

### DT/DTP Series Disassembly

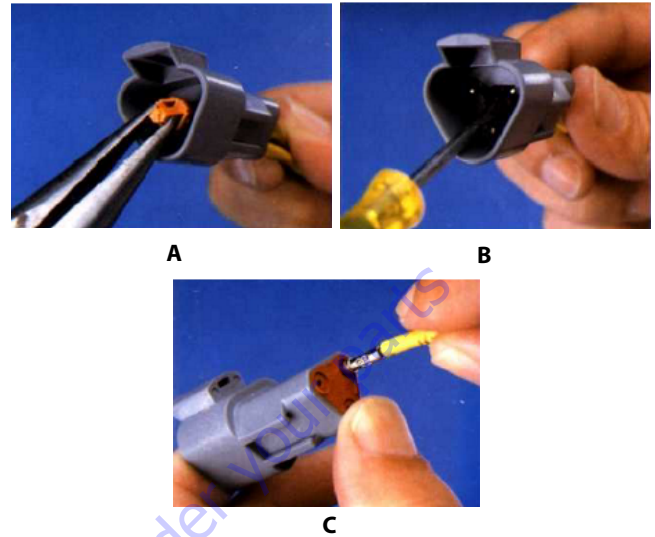
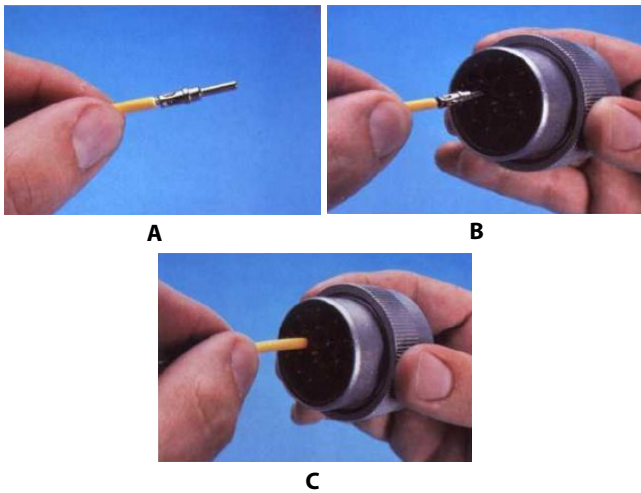


Figure 7-13. DT/DTP Contact Removal

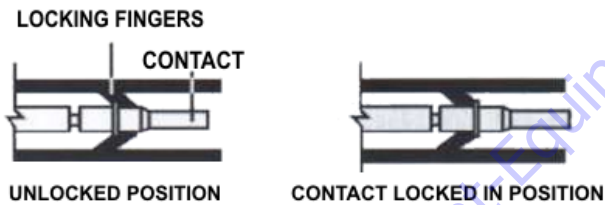
1. Remove wedgelock using needle nose pliers or a hook shaped wire to pull wedge straight out.
2. To remove the contacts, gently pull wire backwards, while at the same time releasing the locking finger by moving it away from the contact with a screwdriver.
3. Hold the rear seal in place, as removing the contact may displace the seal.

**HD30/HDP20 Series Assembly**



**Figure 7-14. HD/HDP Contact Installation**

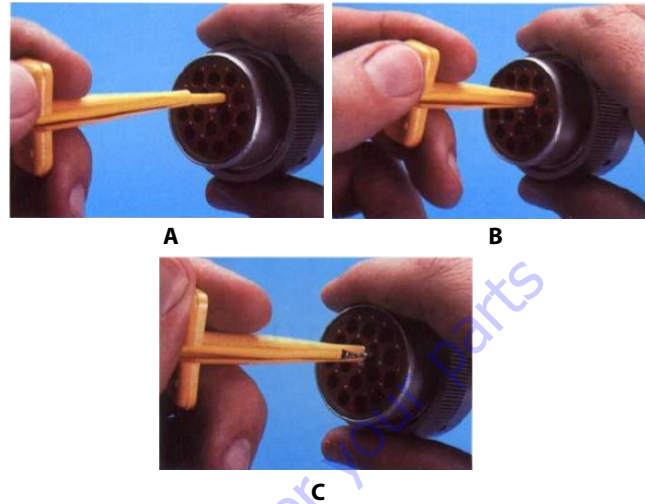
1. Grasp contact about 25mm behind the contact crimp barrel.
2. Hold connector with rear grommet facing you.
3. Push contact straight into connector grommet until a positive stop is felt. A slight tug will confirm that it is properly locked in place.



**Figure 7-15. HD/HDP Locking Contacts Into Position**

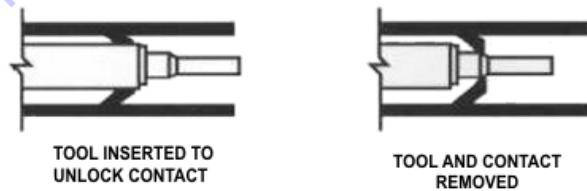
**NOTE:** For unused wire cavities, insert sealing plugs for full environmental sealing.

**HD30/HDP20 Series Disassembly**



**Figure 7-16. HD/HDP Contact Removal**

1. With rear insert toward you, snap appropriate size extractor tool over the wire of contact to be removed.
2. Slide tool along into the insert cavity until it engages contact and resistance is felt.
3. Pull contact-wire assembly out of connector.



**Figure 7-17. HD/HDP Unlocking Contacts**

**NOTE:** Do Not twist or insert tool at an angle.

## 7.8 WIRING HARNESS CONNECTOR LABELS

### Connector Labels

Connectors between harnesses are identified by the prefix "X" and a sequentially assigned number. An optional suffix (letters & numbers) may be added when multiple terminations occur at one device or when there are optional connections.

**Example:**

*X25 connects to X25 in another harness*

*X65A, X65B connect to different portions of one device.*

*X163 connects to X163A in ANSI and X163B in CE machine.*

### Component Labels

Every component on the vehicle has a unique identification. A standard prefix letter is assigned according to the table below, followed by a unique sequential number. An optional suffix (letters & numbers) may be added when multiple terminations occur at one device.

Terminals that are not loaded into connectors are considered independent components and labeled in the same fashion.

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

**Table 7-1. Wiring Harness Connector Labels**

Components	Category	Label
Audible	Alarms	AH
	Horns	
Battery	Batteries	BT
	Battery Terminals	
Control Module	Ground	CO
	LSS	
	Platform	
Engine	Alternator	EC
	Cold Start	
	Controller	
	Coolant Temp	
	Fuel Pump	
	Fuel Solenoid	
	Glow Plugs	
	Oil Pressure	
	Starter	
Fuse & CB Fuse FC	Fuse	FC
	Fusible Link	FC
	Circuit Breaker	CB
Gauge & Display	Board	GD
	Cluster	
	Hour meter	
	LMI	
	Speedometer	
Inline	Resistor	R
	Diode	D
Joystick & Steering	Electronic	JS
	Hydraulic	
Lights	Dome	LB
	Headlights	
	Simple	
	Taillights	
Membrane Panel		MP
Miscellaneous	Radio	MS
	Speakers	
	Splice Blocks	
	T-Connectors	

**Table 7-1. Wiring Harness Connector Labels**

Components	Category	Label	
Other Switches	Disconnect	SW	
	EMS		
	Foot		
		HVAC	WH
		Key	SW
		Parkbrake	
		Pump pot	
		Push	
	Shifter		
	Turn signal		
Relay	5 Pin	RL	
	4 Pin		
	Contactors		
	Power module		
Rocker Switch		SW	
Sensor	Angle	SN	
	Fuel		
	Length		
	Limit		
	Load		
	Pressure		
	Proximity		
	Speed		
	Temperature		
Terminals	Pins	T	
	Sockets		
	Male Blades		
	Female Blades		
	Rings		
	Forks		
Toggle Switch	DPDT	SW	
	DPST		
	SPDT		
	SPST		
	Special		
Valves	Simple	HV	
	Suppression		

**Examples:**

T67 is a ring terminal connected during installation.  
 CO1-J3 is the J3 connector for a UGM control module.  
 EC9 is a glow plug supplied with the engine

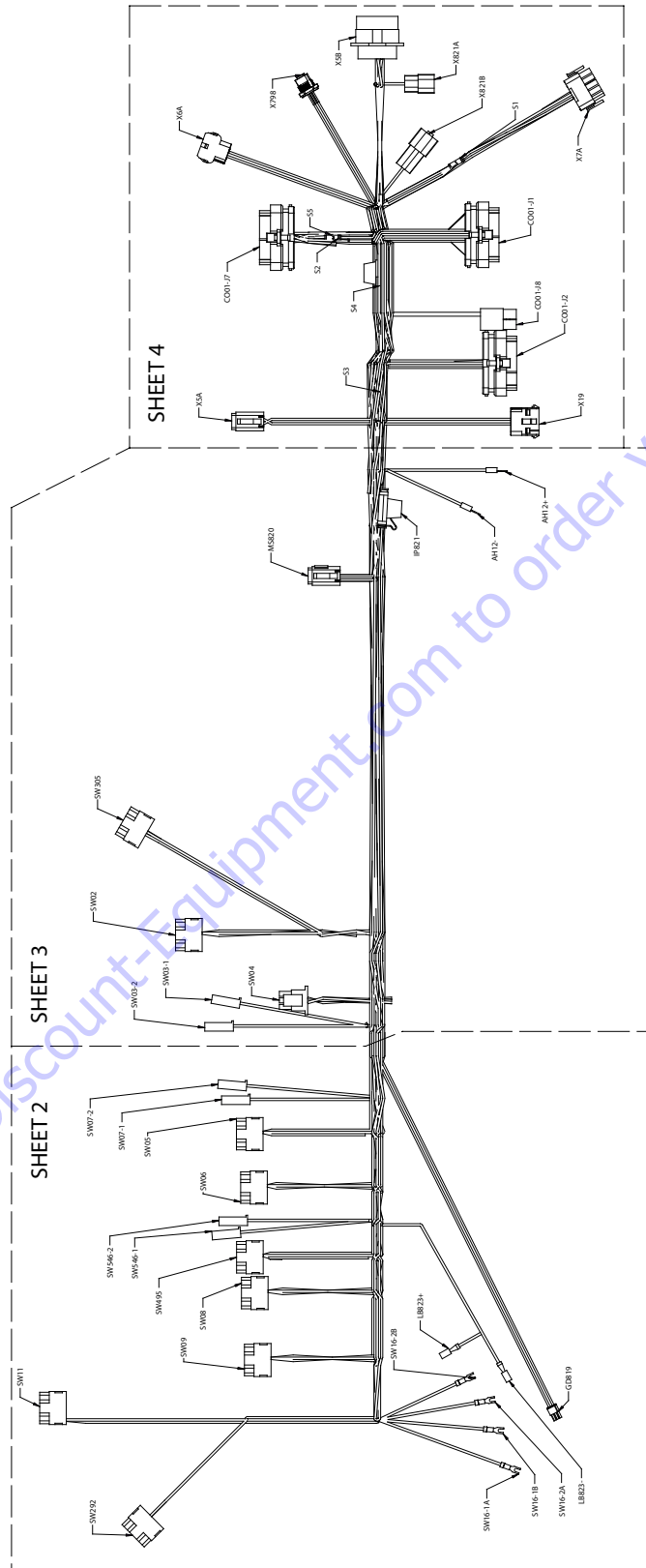
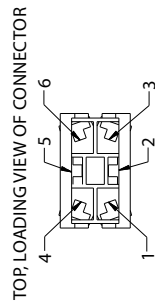
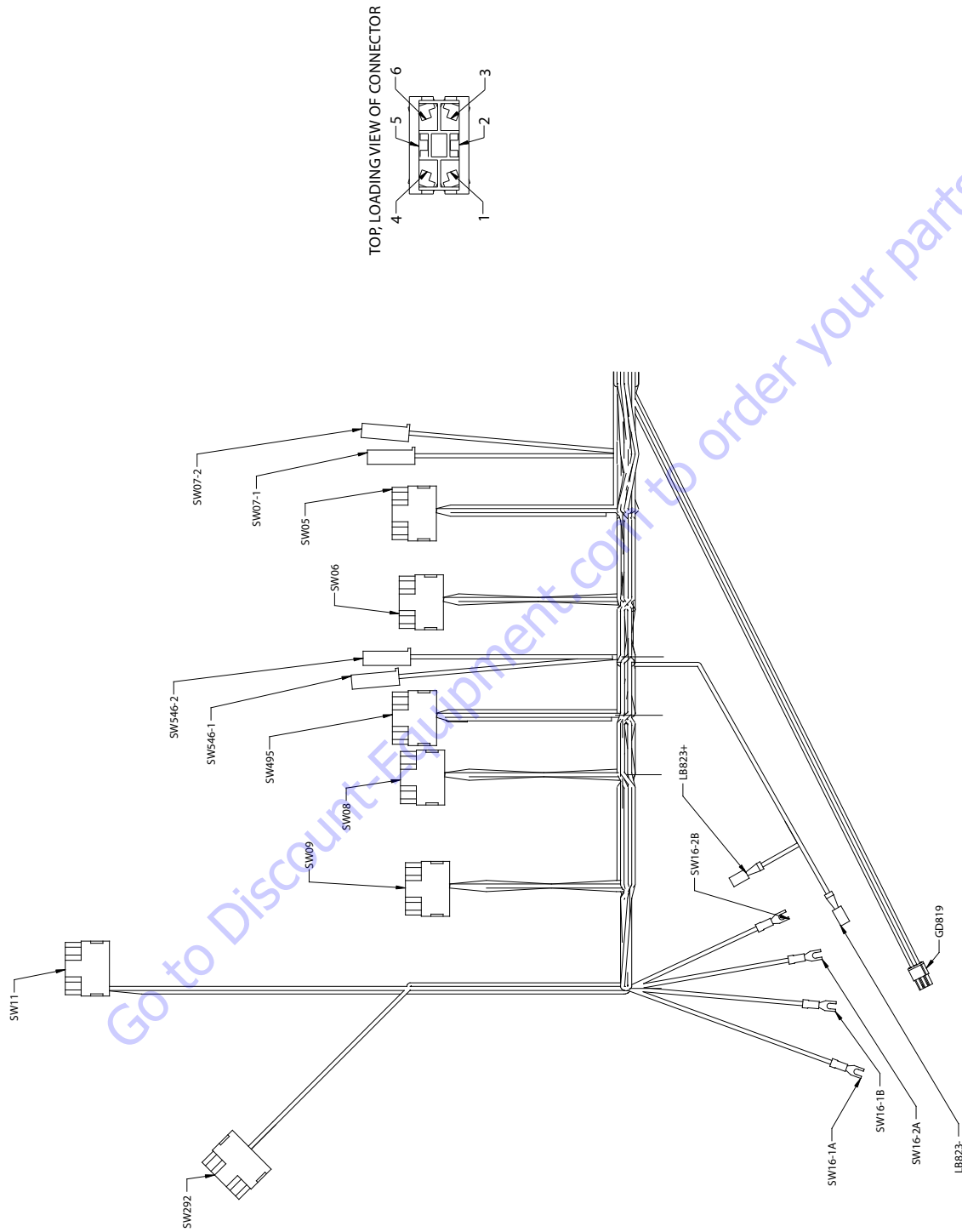


Figure 7-18. Platform Console Harness - Sheet 1 of 9

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MAF18110C



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Figure 7-19. Platform Console Harness - Sheet 2 of 9



**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

SW11 - DRIVE ORIENT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	122-1 DOS	18 AWG	GXL	CO01-J2 (4)
2	WHT	5-14-10 SW PWR	18 AWG	GXL	SW546-2 (1)
2	WHT	5-14-9 SW PWR	18 AWG	GXL	SW03-1 (1)
3					
4					
5					
6					

SW495 - SIDE SWING					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	31-0 SIDE SWING LEFT	18 AWG	GXL	CO01-J1 (26)
2	WHT	5-14-6 SW PWR	18 AWG	GXL	SW08 (2)
2	WHT	5-14-7	18 AWG	GXL	SW04 (1)
3	WHT	32-0 SIDE SWING RIGHT	18 AWG	GXL	CO01-J1 (25)
4					
5					
6					

SW292 - GEN ENABLE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	2-12-2 GEN ENABLE IGN	18 AWG	GXL	X5B (7)
3	WHT	8-3 GEN ENABLE	18 AWG	GXL	X5B (5)
4					
5					
6					

SW06 - TOWER LIFT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	29-30 TWR LFT DN	18 AWG	GXL	CO01-J1 (2)
2	WHT	5-14-1 SW PWR	18 AWG	GXL	SW305 (2)
2	WHT	5-14-2 SW PWR	18 AWG	GXL	SW09 (2)
3	WHT	29-0 TWR LFT UP	18 AWG	GXL	CO01-J1 (1)
4					
5					
6					

SW09 - MAIN TELESCOPE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	14-0 MAIN TELE OUT	18 AWG	GXL	CO01-J1 (6)
2	WHT	5-14-2 SW PWR	18 AWG	GXL	SW06 (2)
2	WHT	5-14-3 SW PWR	18 AWG	GXL	SW05 (2)
3	WHT	13-0 MAIN TELE IN	18 AWG	GXL	CO01-J1 (5)
4					
5					
6					

SW546-1 - SKYGUARD/SOFTTOUCH OVERRIDE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	124-3 OVERRIDE	18 AWG	GXL	CO01-J1 (29)

SW546-2 - SKYGUARD/SOFTTOUCH OVERRIDE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-14-10 SW PWR	18 AWG	GXL	SW11 (2)
1	WHT	5-14-11 SW PWR	18 AWG	GXL	SW07-2 (1)

SW08 - JIB					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	28-0 JIB DN	18 AWG	GXL	CO01-J1 (12)
2	WHT	5-14-5 SW PWR	18 AWG	GXL	SW02 (2)
2	WHT	5-14-6 SW PWR	18 AWG	GXL	SW495 (2)
3	WHT	27-0 JIB UP	18 AWG	GXL	CO01-J1 (11)
4					
5					
6					

SW05 - PLATFORM ROTATE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	23-0 PLAT ROT LFT	18 AWG	GXL	CO01-J1 (8)
2	WHT	5-14-3 SW PWR	18 AWG	GXL	SW09 (2)
2	WHT	5-14-4 SW PWR	18 AWG	GXL	SW02 (2)
3	WHT	24-0 PLAT ROT RT	18 AWG	GXL	CO01-J1 (7)
4					
5					
6					

SW16-1A - EMS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1A	WHT	5-11-2	18 AWG	GXL	X5B (9)

SW07-1 - HEAD/TAIL LIGHTS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	88-1 HEAD/TAIL LT	18 AWG	GXL	CO01-J1 (30)

SW16-1B - EMS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1B	WHT	5-2-6	18 AWG	GXL	X5B (13)

SW07-2 - HEAD/TAIL LIGHTS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-14-11 SW PWR	18 AWG	GXL	SW546-2 (1)

SW16-2A - EMS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
2A	WHT	5-11-3	18 AWG	GXL	CO01-J7 (2)

GD819					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	CAN1 HIGH	20 AWG	TXL	MS820 (2)
2					
3	WHT	1-90 DISPLAY PWR	20 AWG	TXL	IP821 (1)
4	GRN	CAN1 LOW	20 AWG	TXL	MS820 (8)
5					
6	WHT	1-26 DISPLAY GND	20 AWG	TXL	CO01-J2 (18)

SW16-2B - EMS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
2B	WHT	5-2-5	18 AWG	GXL	X5B (15)

LB823+ - SG/ST LT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-31 SG/ST	18 AWG	GXL	CO01-J2 (16)

LB823- - GND					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	1-32 GND	18 AWG	GXL	CO01-J2 (25)

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**Figure 7-20. Platform Console Harness - Sheet 3 of 9**

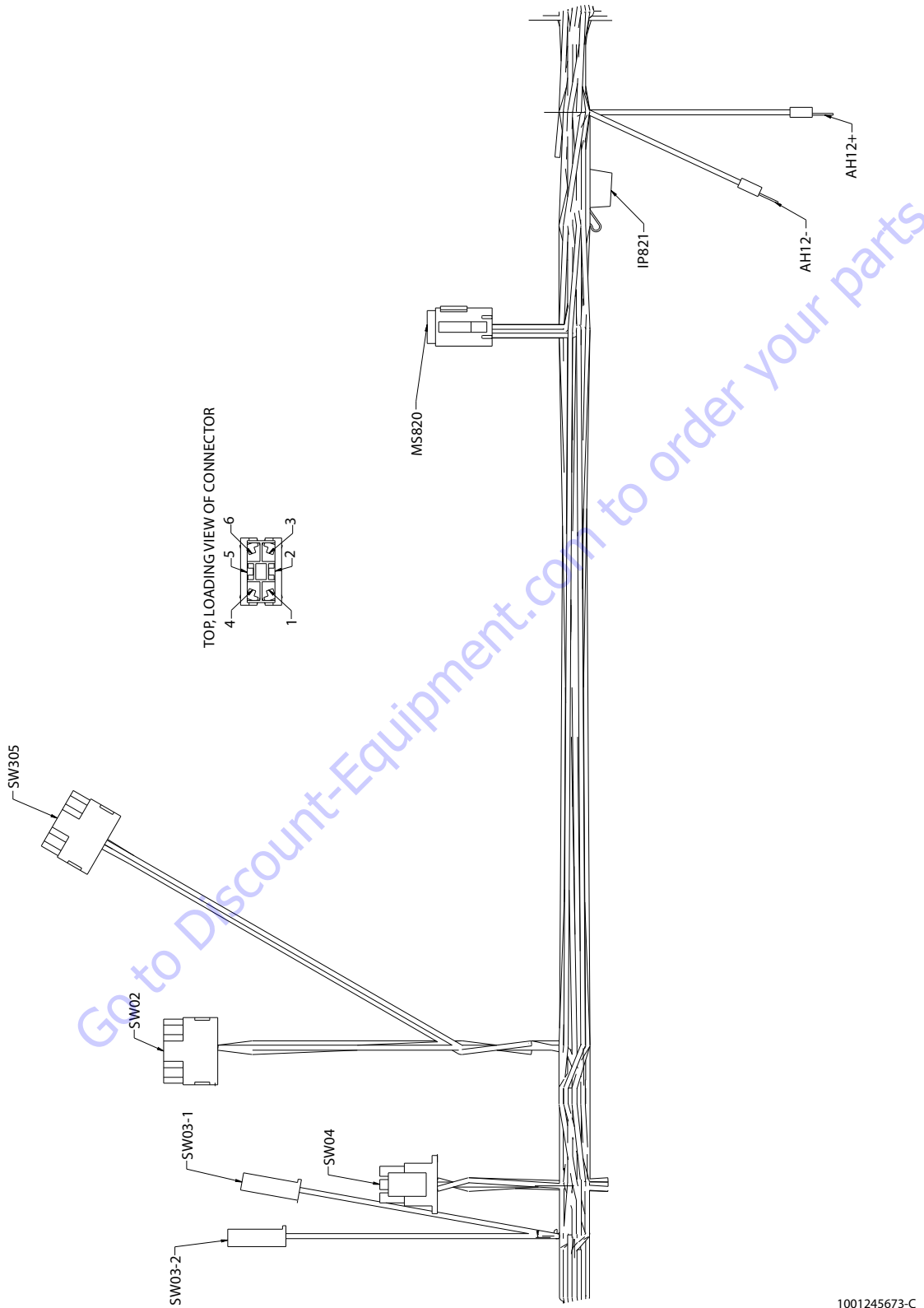


Figure 7-21. Platform Console Harness - Sheet 4 of 9

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

SW03-2 - HORN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	49-0-1 HORN	18 AWG	GXL	CO01-J1 (31)

SW03-1 - HORN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-14-8 SW PWR	18 AWG	GXL	SW04 (1)
1	WHT	5-14-9 SW PWR	18 AWG	GXL	SW11 (2)

SW02 - PLATFORM LEVEL					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	26-0 PLAT LVL DN	18 AWG	GXL	CO01-J1 (10)
2	WHT	5-14-4 SW PWR	18 AWG	GXL	SW05 (2)
2	WHT	5-14-5 SW PWR	18 AWG	GXL	SW08 (2)
3	WHT	25-0 PLAT LVL UP	18 AWG	GXL	CO01-J1 (9)
4					
5					
6					

SW305 - TORQUE/SPEED MODE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	120-2 AWDA MAN	18 AWG	GXL	CO01-J1 (28)
2	WHT	5-14-1 SW PWR	18 AWG	GXL	SW06 (2)
3	WHT	120-1 TORQUE/SPEED MODE	18 AWG	GXL	CO01-J1 (27)
4					
5					
6					

MS820 - CAN BUSS BAR					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	YEL	CAN1 HIGH	20 AWG	TXL	GD819 (1)
3	YEL	CAN1 HIGH	18 AWG	GXL	CO01-J7 (31)
4	GRN	CAN1 LOW	18 AWG	GXL	CO01-J7 (30)
5	GRY	CAN1 LOW	20 AWG	CABLE	X798 (5)
6	GRN	CAN1 LOW	18 AWG	GXL	X821B (2)
7	GRN	CAN1 LOW	18 AWG	GXL	X6A (9)
8	GRN	CAN1 LOW	20 AWG	TXL	GD819 (4)
9					
10	BLK	CAN1 HIGH	20 AWG	CABLE	X798 (4)
11	YEL	CAN1 HIGH	18 AWG	GXL	X821B (1)
12	YEL	CAN1 HIGH	18 AWG	GXL	X6A (8)

SW04 - PUMP POT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	5-14-7	18 AWG	GXL	SW495 (2)
1	WHT	5-14-8 SW PWR	18 AWG	GXL	SW03-1 (1)
2	WHT	5-14 SW PWR	18 AWG	GXL	CO01-J1 (18)
3	WHT	125-1 CREEP MODE	18 AWG	GXL	CO01-J1 (32)
4	WHT	126-1 PUMP POT PWR	18 AWG	GXL	CO01-J1 (34)
5	WHT	1-23 PUMP POT RETURN	18 AWG	GXL	CO01-J1 (13)
6	WHT	126-2 PUMP POT CMD	18 AWG	GXL	CO01-J1 (35)

AH12- - ALARM-					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-27 ALARM GND	18 AWG	GXL	CO01-J7 (20)

AH12+ - ALARM+					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	132 PLAT ALARM	18 AWG	GXL	CO01-J7 (19)

IP821					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-90 DISPLAY PWR	20 AWG	TXL	GD819 (3)
2	WHT	1-90 DISPLAY PWR	18 AWG	GXL	CO01-J2 (30)

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**Figure 7-22. Platform Console Harness - Sheet 5 of 9**

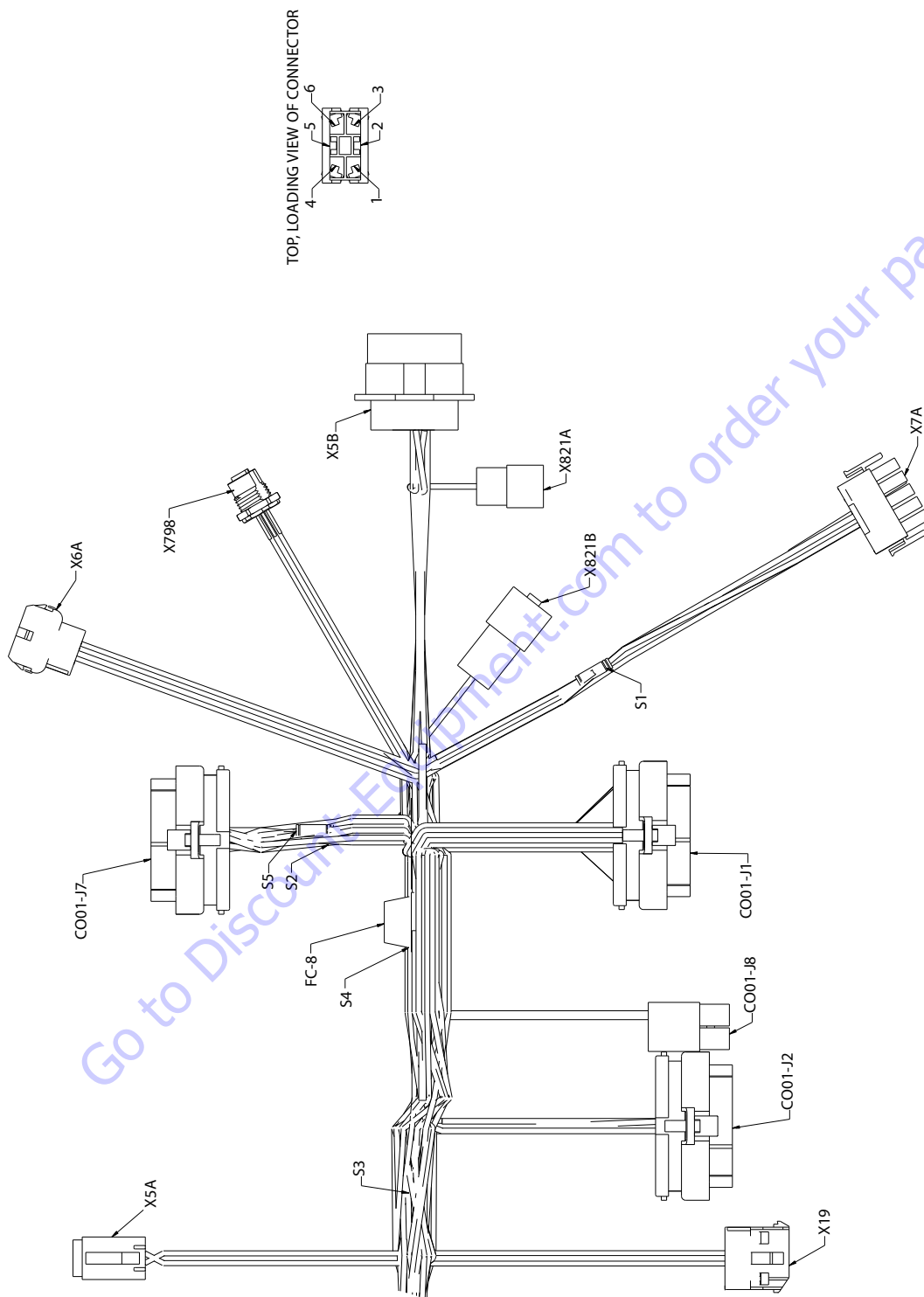


Figure 7-23. Platform Console Harness - Sheet 6 of 9

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

CO01-J7 - BLACK					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	81-0 GND MODE RX	18 AWG	GXL	X5B (11)
2	WHT	5-11-3	18 AWG	GXL	SW16-2A (2A)
3	WHT	82-0 PLAT TX	18 AWG	GXL	X5B (4)
4	WHT	3-16 FOOTSWITCH	18 AWG	GXL	X7A (5)
5					
6					
7	WHT	3-18 SKYG PWR	18 AWG	GXL	S5 (1)
8	WHT	131-1 FOOT SWITCH	18 AWG	GXL	X7A (4)
9					
10					
11					
12					
13					
14					
15					
16	WHT	1-28 LSS GND	18 AWG	GXL	S2 (1)
17					
18	WHT	124-1 SKYG INPUT#1	20 AWG	SXL	X5A (4)
19	WHT	132 PLAT ALARM	18 AWG	GXL	AH12+ (1)
20	WHT	1-27 ALARM GND	18 AWG	GXL	AH12- (1)
21	WHT	25-0-3 PLAT LVL UP	18 AWG	GXL	X6A (13)
22	WHT	26-0-3 PLAT LVL DN	18 AWG	GXL	X6A (14)
23	WHT	1-30 VLV GND	18 AWG	GXL	X6A (5)
24	WHT	1-36 SKYG GND	18 AWG	GXL	X5A (2)
25					
26					
27	WHT	31-0-3 JIB RHT	18 AWG	GXL	X6A (11)
28	WHT	30-0-3 JIB LFT	18 AWG	GXL	X6A (12)
29	WHT	1-29 OPTION GND	18 AWG	GXL	X6A (6)
30	GRN	CAN1 LOW	18 AWG	GXL	MS820 (4)
31	YEL	CAN1 HIGH	18 AWG	GXL	MS820 (3)
32					
33	WHT	23-0-3 PLAT ROT LFT	18 AWG	GXL	X6A (1)
34	WHT	24-0-3 PLAT ROT RHT	18 AWG	GXL	X6A (2)
35					

X6A - OPTIONS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	23-0-3 PLAT ROT LFT	18 AWG	GXL	CO01-J7 (33)
2	WHT	24-0-3 PLAT ROT RHT	18 AWG	GXL	CO01-J7 (34)
3					
4					
5	WHT	1-30 VLV GND	18 AWG	GXL	CO01-J7 (23)
6	WHT	1-29 OPTION GND	18 AWG	GXL	CO01-J7 (29)
7					
8	YEL	CAN1 HIGH	18 AWG	GXL	MS820 (12)
9	GRN	CAN1 LOW	18 AWG	GXL	MS820 (7)
10					
11	WHT	31-0-3 JIB RHT	18 AWG	GXL	CO01-J7 (27)
12	WHT	30-0-3 JIB LFT	18 AWG	GXL	CO01-J7 (28)
13	WHT	25-0-3 PLAT LVL UP	18 AWG	GXL	CO01-J7 (21)
14	WHT	26-0-3 PLAT LVL DN	18 AWG	GXL	CO01-J7 (22)
15					

X5A - INTERFACE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	3-18-1 SKYG PWR	20 AWG	GXL	S3 (2)
2	WHT	1-36 SKYG GND	18 AWG	GXL	CO01-J7 (24)
3	WHT	3-18-2 SOFTT SENSE	20 AWG	GXL	S3 (2)
4	WHT	124-1 SKYG INPUT#1	20 AWG	GXL	CO01-J7 (18)
5	WHT	124-2 SKYG INPUT#2	20 AWG	GXL	CO01-J1 (23)
6	WHT	124-5-1 SOFTT OUT	20 AWG	GXL	S4 (2)

X798 - 1 CELL LSS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	3-20-2 LSS PWR	20 AWG	CABLE	S1 (1)
3	BLU	1-28-2 LSS GND	20 AWG	CABLE	S2 (2)
4	BLK	CAN1 HIGH	20 AWG	CABLE	MS820 (10)
5	GRY	CAN1 LOW	20 AWG	CABLE	MS820 (5)

X5B - TO BOOM CABLE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	GRN	CAN1 LOW	18 AWG	GXL	X821A (2)
3	YEL	CAN1 HIGH	18 AWG	GXL	X821A (1)
4	WHT	82-0 PLAT TX	18 AWG	GXL	CO01-J7 (3)
5	WHT	8-3 GEN ENABLE	18 AWG	GXL	SW292 (3)
6	WHT	131-3 FOOT PEDAL	18 AWG	GXL	X7A (6)
7	WHT	2-12-2 GEN ENABLE IGN	18 AWG	GXL	SW292 (2)
8					
9	WHT	5-11-2	18 AWG	GXL	SW16-1A (1A)
10					
11	WHT	81-0 GND MODE RX	18 AWG	GXL	CO01-J7 (1)
12	WHT	3-8 PLAT IGN	12 AWG	GXL	CO01-J8 (2)
13	WHT	5-2-6	18 AWG	GXL	SW16-1B (1B)
14					
15	WHT	5-2-5	18 AWG	GXL	SW16-2B (2B)
16	WHT	1-5 PLAT GND	12 AWG	GXL	CO01-J8 (1)
17					
18					
19					

X7A - FOOT SW/LSS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2					
3	WHT	1-551 JUMPER	18 AWG	GXL	X7A (13)
4	WHT	131-1 FOOT SWITCH	18 AWG	GXL	CO01-J7 (8)
5	WHT	3-16 FOOTSWITCH	18 AWG	GXL	CO01-J7 (4)
6	WHT	131-3 FOOT PEDAL	18 AWG	GXL	X5B (6)
7					
8					
9	WHT	3-25 SOFTT PWR	18 AWG	GXL	CO01-J2 (31)
10					
11					
12	WHT	124-5-2 SOFTT OUT	20 AWG	GXL	S4 (1)
13	WHT	1-551 JUMPER	18 AWG	GXL	X7A (8)
14	WHT	1-28-1 LSS GND	18 AWG	GXL	S2 (2)
15	WHT	3-20-1 LSS PWR	18 AWG	GXL	S1 (2)

CO01-J8					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-5 PLAT GND	12 AWG	GXL	X5B (16)
2	WHT	3-8 PLAT IGN	12 AWG	GXL	X5B (12)

X821B					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	CAN1 HIGH	18 AWG	GXL	MS820 (11)
2	GRN	CAN1 LOW	18 AWG	GXL	MS820 (6)
3					

X821A					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	CAN1 HIGH	18 AWG	GXL	X5B (3)
2	GRN	CAN1 LOW	18 AWG	GXL	X5B (2)
3					

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**Figure 7-24. Platform Console Harness - Sheet 7 of 9**

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

CO01-J2 - GRAY					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2					
3					
4	WHT	122-1 DOS	18 AWG	GXL	SW11 (1)
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16	WHT	1-31 SG/ST	18 AWG	GXL	LB823+ (1)
17					
18	WHT	1-26 DISPLAY GND	20 AWG	TXL	GD819 (6)
19					
20					
21					
22					
23					
24					
25	BLK	1-32 GND	18 AWG	GXL	LB823- (1)
26	RED	51-0 ANALYZER PWR	18 AWG	GXL	X19 (1)
27	BLK	54-0 ANALYZER GND	18 AWG	GXL	X19 (4)
28	GRN	52-0 ANALYZER RX	18 AWG	GXL	X19 (2)
29	WHT	53-0 ANALYZER TX	18 AWG	GXL	X19 (3)
30	WHT	1-90 DISPLAY PWR	18 AWG	GXL	IP821 (2)
31	WHT	3-25 SOFTT PWR	18 AWG	GXL	X7A (9)
32	WHT	3-20 LSS PWR	18 AWG	GXL	S1 (1)
33					
34					
35					

S1					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	3-20 LSS PWR	18 AWG	GXL	CO01-J2 (32)
1	WHT	3-20-2 LSS PWR	20 AWG	CABLE	X798 (2)
2	WHT	3-20-1 LSS PWR	18 AWG	GXL	X7A (15)

S2					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-28 LSS GND	18 AWG	GXL	CO01-J7 (16)
2	WHT	1-28-1 LSS GND	18 AWG	GXL	X7A (14)
2	BLU	1-28-2 LSS GND	20 AWG	CABLE	X798 (3)

S3					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK		14 AWG	GXL	FC-8 (2)
2	WHT	3-18-1 SKYG PWR	20 AWG	GXL	X5A (1)
2	WHT	3-18-2 SOFTT SENSE	20 AWG	GXL	X5A (3)

S4					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	124-5 SOFTT	20 AWG	GXL	CO01-J1 (20)
1	WHT	124-5-2 SOFTT OUT	20 AWG	GXL	X7A (12)
2	WHT	124-5-1 SOFTT OUT	20 AWG	GXL	X5A (6)

S5					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	3-18 SKYG PWR	18 AWG	GXL	CO01-J7 (7)
2	BLK		14 AWG	GXL	FC-8 (1)

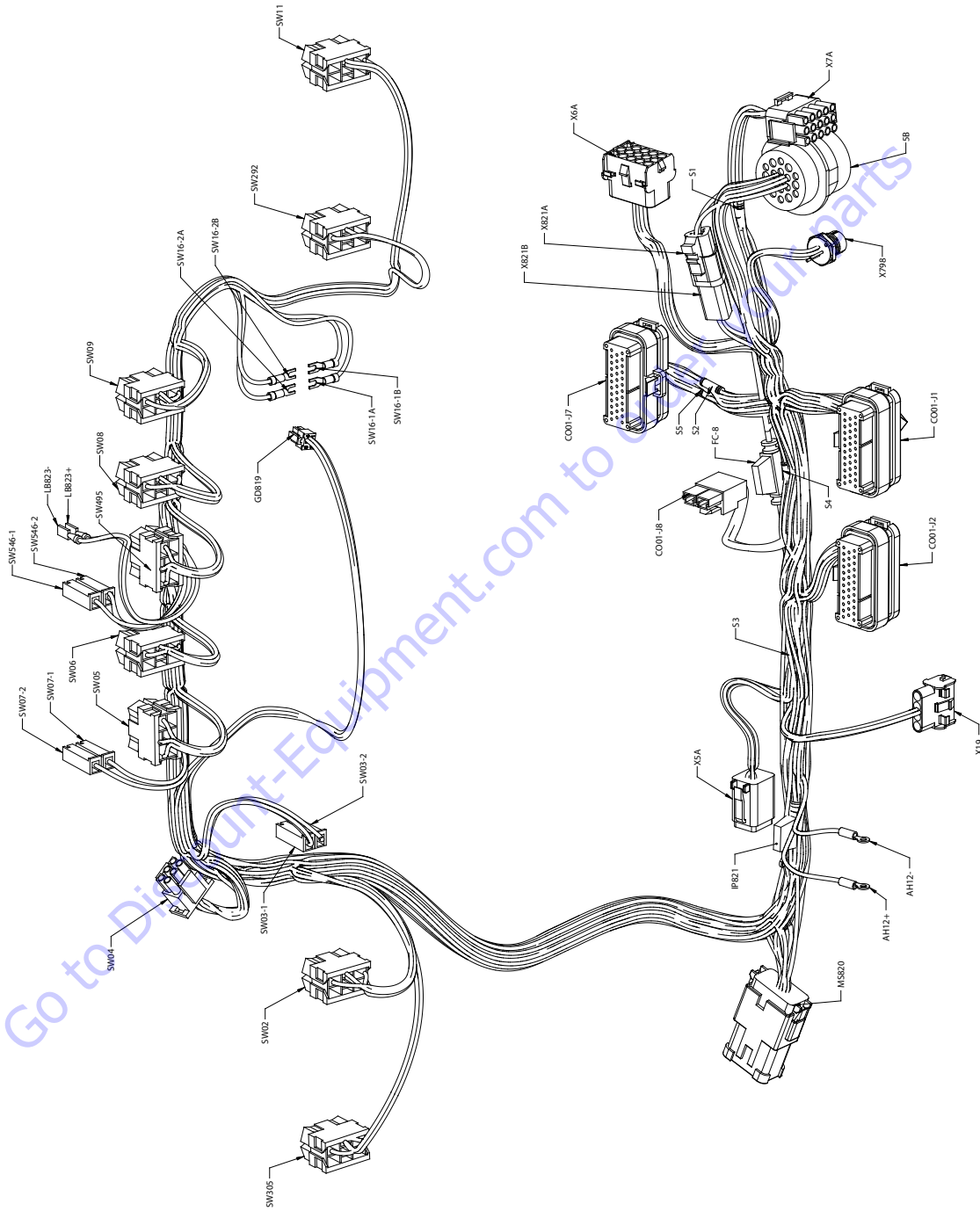
FC-8 - 5A SKYG FUSE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK		14 AWG	GXL	S5 (2)
2	BLK		14 AWG	GXL	S3 (1)

X19 - ANALYZER					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	51-0 ANALYZER PWR	18 AWG	GXL	CO01-J2 (26)
2	GRN	52-0 ANALYZER RX	18 AWG	GXL	CO01-J2 (28)
3	WHT	53-0 ANALYZER TX	18 AWG	GXL	CO01-J2 (29)
4	BLK	54-0 ANALYZER GND	18 AWG	GXL	CO01-J2 (27)

CO01-J1 - NATURAL					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	29-0 TWR LFT UP	18 AWG	GXL	SW06 (3)
2	WHT	29-30 TWR LFT DN	18 AWG	GXL	SW06 (1)
3					
4					
5	WHT	13-0 MAIN TELE IN	18 AWG	GXL	SW09 (3)
6	WHT	14-0 MAIN TELE OUT	18 AWG	GXL	SW09 (1)
7	WHT	24-0 PLAT ROT RT	18 AWG	GXL	SW05 (3)
8	WHT	23-0 PLAT ROT LFT	18 AWG	GXL	SW05 (1)
9	WHT	25-0 PLAT LVL UP	18 AWG	GXL	SW02 (3)
10	WHT	26-0 PLAT LVL DN	18 AWG	GXL	SW02 (1)
11	WHT	27-0 JIB UP	18 AWG	GXL	SW08 (3)
12	WHT	28-0 JIB DN	18 AWG	GXL	SW08 (1)
13	WHT	1-23 PUMP POT RETURN	18 AWG	GXL	SW04 (5)
14					
15					
16					
17					
18	WHT	5-14 SW PWR	18 AWG	GXL	SW04 (2)
19					
20	WHT	124-5 SOFTT	20 AWG	GXL	S4 (1)
21					
22					
23	WHT	124-2 SKYG INPUT#2	20 AWG	GXL	X5A (5)
24					
25	WHT	32-0 SIDE SWING RIGHT	18 AWG	GXL	SW495 (3)
26	WHT	31-0 SIDE SWING LEFT	18 AWG	GXL	SW495 (1)
27	WHT	120-1 TORQUE/SPEED MODE	18 AWG	GXL	SW305 (3)
28	WHT	120-2 AWDA MAN	18 AWG	GXL	SW305 (1)
29	WHT	124-3 OVERRIDE	18 AWG	GXL	SW546-1 (1)
30	WHT	88-1 HEAD/TAIL LT	18 AWG	GXL	SW07-1 (1)
31	WHT	49-0-1 HORN	18 AWG	GXL	SW03-2 (1)
32	WHT	125-1 CREEP MODE	18 AWG	GXL	SW04 (3)
33					
34	WHT	126-1 PUMP POT PWR	18 AWG	GXL	SW04 (4)
35	WHT	126-2 PUMP POT CMD	18 AWG	GXL	SW04 (6)

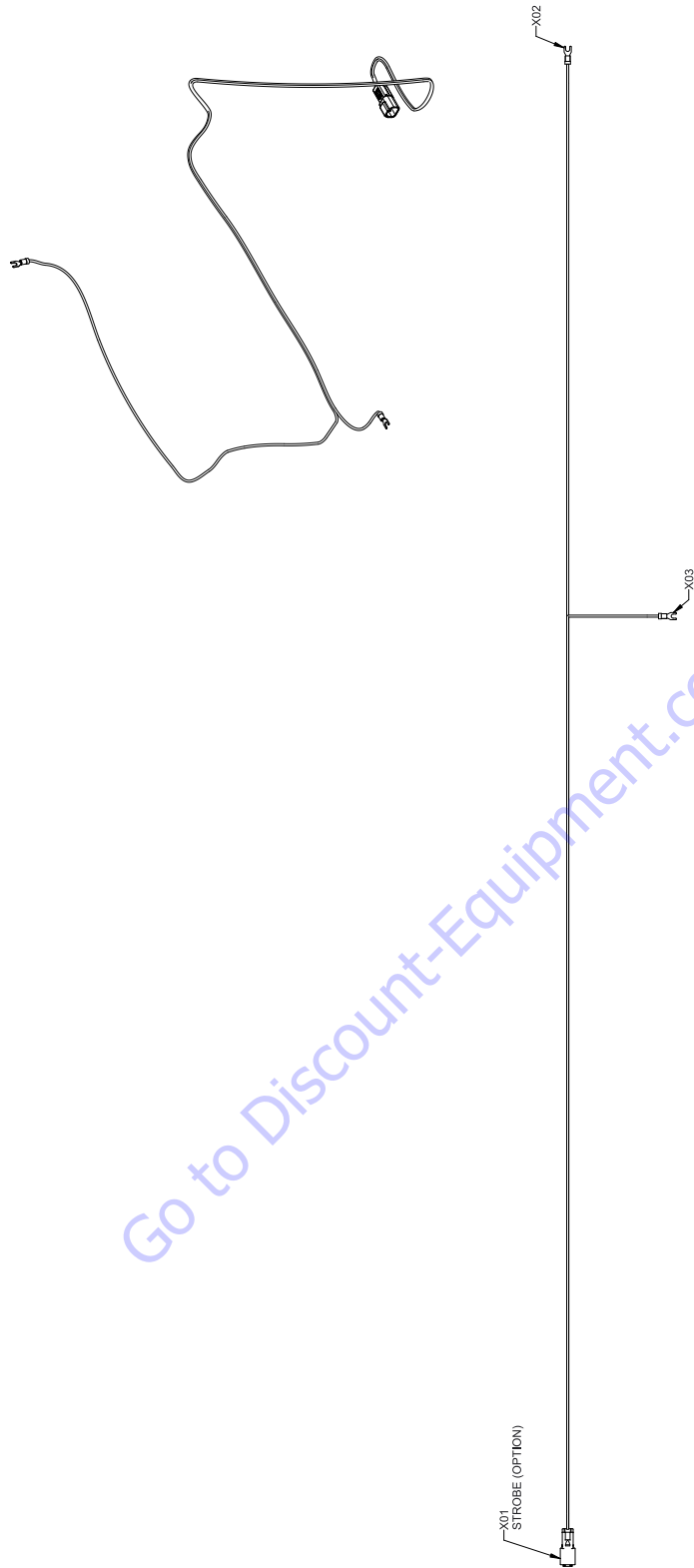
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**Figure 7-25. Platform Console Harness - Sheet 8 of 9**



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Figure 7-26. Platform Console Harness - Sheet 9 of 9



X01 STROBE (OPTION)					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N
1	BLU/ORN	P1 PWR	18 AWG	TFFN	4460464
2	BLK	P2 GND	18 AWG	TFFN	4460464
					TO X02 (1)
					X03 (1)

X02					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N
1	BLU/ORN	P1 PWR	18 AWG	TFFN	N/A
					TO X01 (1)

X03					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N
1	BLK	P2 GND	18 AWG	TFFN	N/A
					TO X01 (2)

Figure 7-27. Platform Beacon Harness

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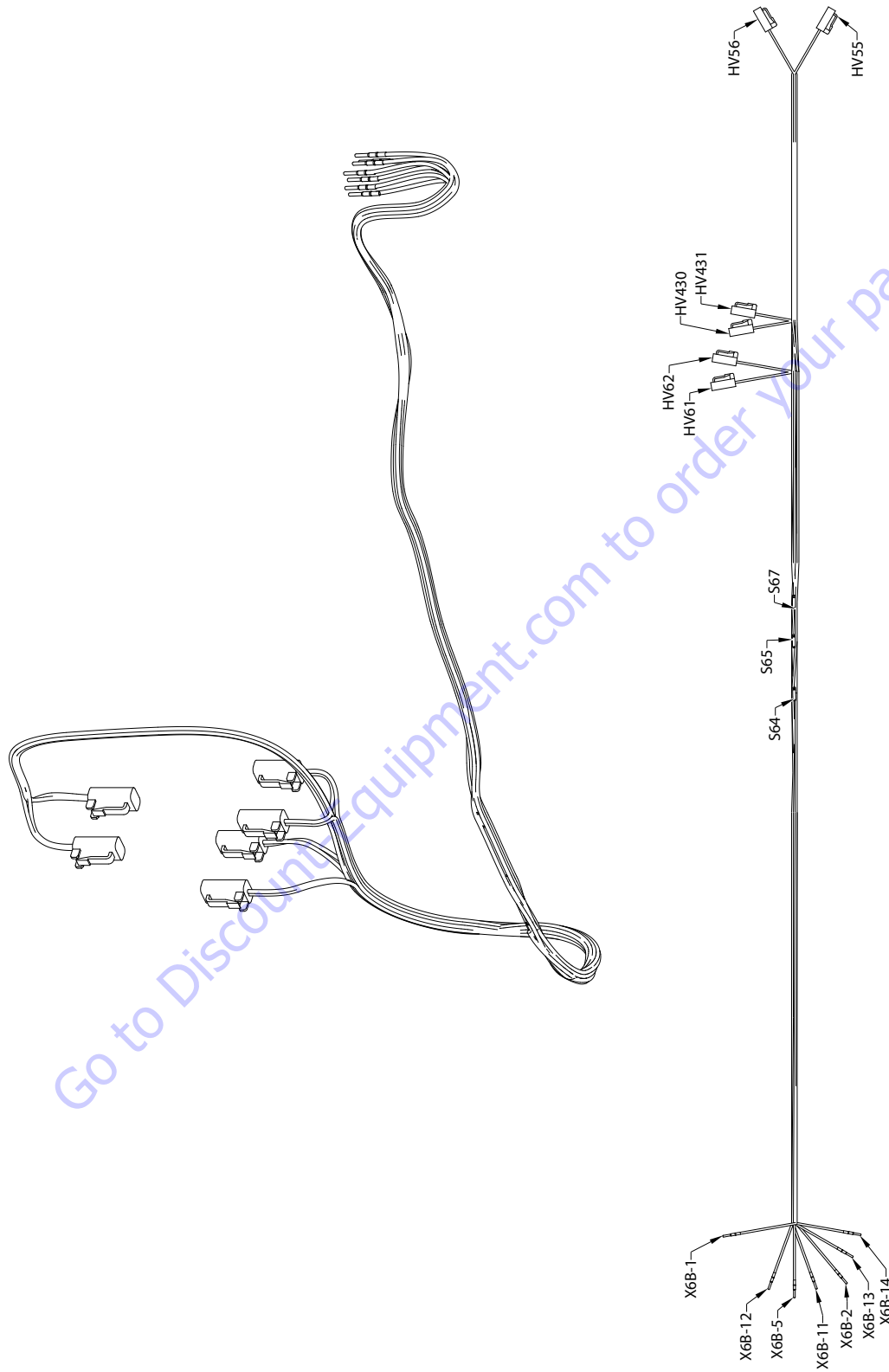


Figure 7-28. Upper Valve Harness - Sheet 1 of 2

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

X6B-1 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	173-1 PLAT ROT LEFT	18 AWG	GXL	HV55 (1)

X6B-12 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	115-2 JIB SWING LEFT	18 AWG	GXL	HV431 (1)

X6B-2 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	172-1 PLAT ROT RIGHT	18 AWG	GXL	HV56 (1)

X6B-11 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	115-1 JIB SWING RIGHT	18 AWG	GXL	HV430 (1)

X6B-5 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-24 VALVE RETURN	18 AWG	GXL	S64 (2)

X6B-13 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	113-3 PLAT LEVEL UP	18 AWG	GXL	HV62 (1)

X6B-14 - TO CONSOLE HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	114-3 PLAT LEVEL DOWN	18 AWG	GXL	HV61 (1)

S64					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-24-1 PLATFORM GND	18 AWG	GXL	S67 (1)
1	WHT	1-24-2 JIB GND	18 AWG	GXL	S65 (1)
2	WHT	1-24 VALVE RETURN	18 AWG	GXL	X6B-5 (1)

S65					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-24-2 JIB GND	18 AWG	GXL	S64 (1)
1	WHT	1-24-9 JIB RIGHT GND	18 AWG	GXL	HV430 (2)
2	WHT	1-24-8 JIB LEFT GND	18 AWG	GXL	HV431 (2)

HV61 - LEVEL DOWN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	114-3 PLAT LEVEL DOWN	18 AWG	GXL	X6B-14 (1)
2	WHT	1-24-10 PLAT LEVEL DOWN GND	18 AWG	GXL	S67 (2)

HV62 - LEVEL UP					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	113-3 PLAT LEVEL UP	18 AWG	GXL	X6B-13 (1)
2	WHT	1-24-5 PLAT LEVEL UP GND	18 AWG	GXL	S67 (1)

HV430 - JIB RIGHT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	115-1 JIB SWING RIGHT	18 AWG	GXL	X6B-11 (1)
2	WHT	1-24-9 JIB RIGHT GND	18 AWG	GXL	S65 (1)

HV431 - JIB LEFT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	115-2 JIB SWING LEFT	18 AWG	GXL	X6B-12 (1)
2	WHT	1-24-8 JIB LEFT GND	18 AWG	GXL	S65 (2)

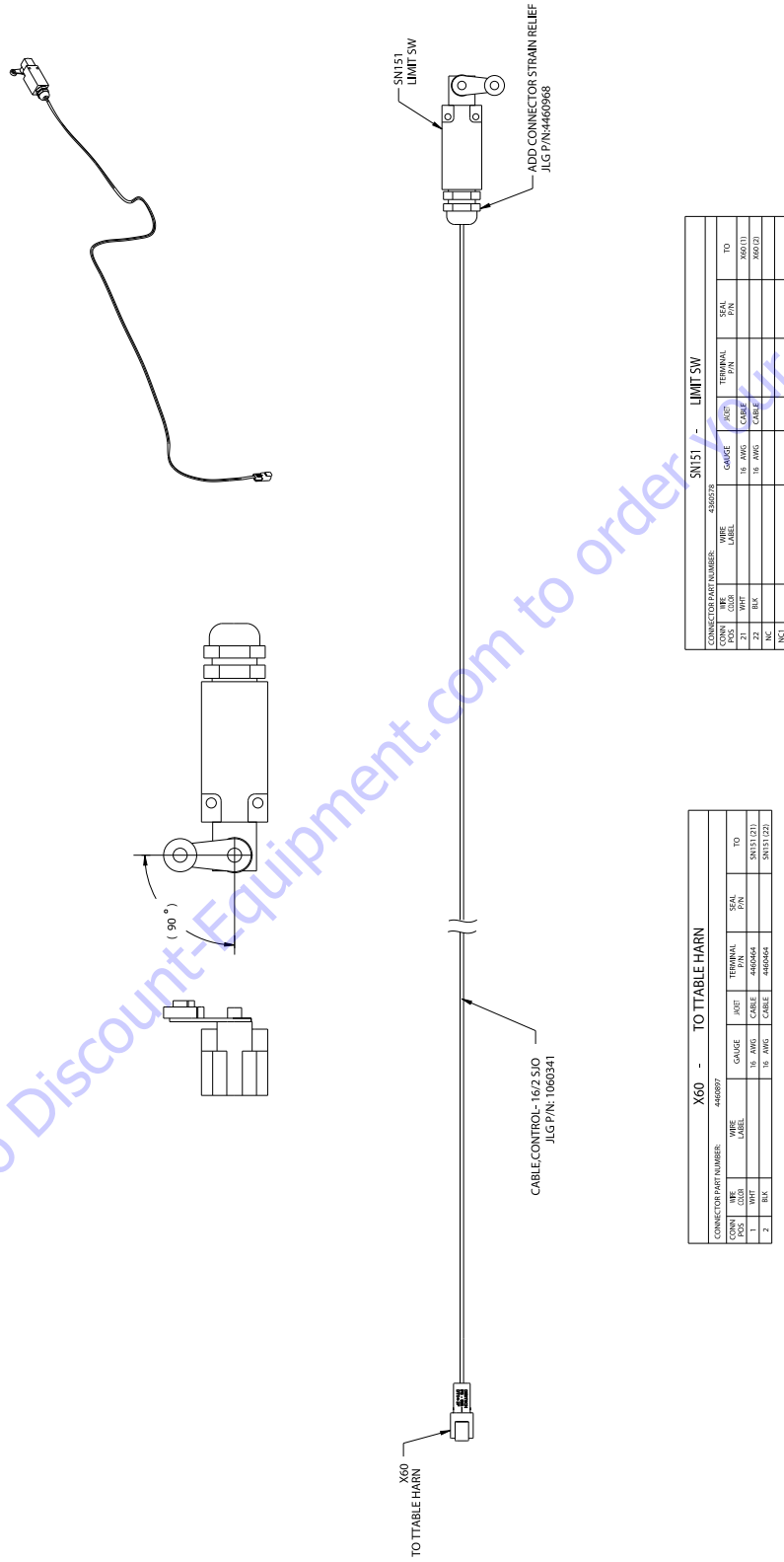
HV56 - ROTATE RIGHT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	172-1 PLAT ROT RIGHT	18 AWG	GXL	X6B-2 (1)
2	WHT	1-24-4 PLAT ROT RIGHT GND	18 AWG	GXL	S67 (2)

HV55 - ROTATE LEFT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	173-1 PLAT ROT LEFT	18 AWG	GXL	X6B-1 (1)
2	WHT	1-24-3 PLAT ROT LEFT GND	18 AWG	GXL	S67 (2)

S67					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-24-1 PLATFORM GND	18 AWG	GXL	S64 (1)
1	WHT	1-24-5 PLAT LEVEL UP GND	18 AWG	GXL	HV62 (2)
2	WHT	1-24-10 PLAT LEVEL DOWN GND	18 AWG	GXL	HV61 (2)
2	WHT	1-24-3 PLAT ROT LEFT GND	18 AWG	GXL	HV55 (2)
2	WHT	1-24-4 PLAT ROT RIGHT GND	18 AWG	GXL	HV56 (2)

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**Figure 7-29. Upper Valve Harness - Sheet 2 of 2**

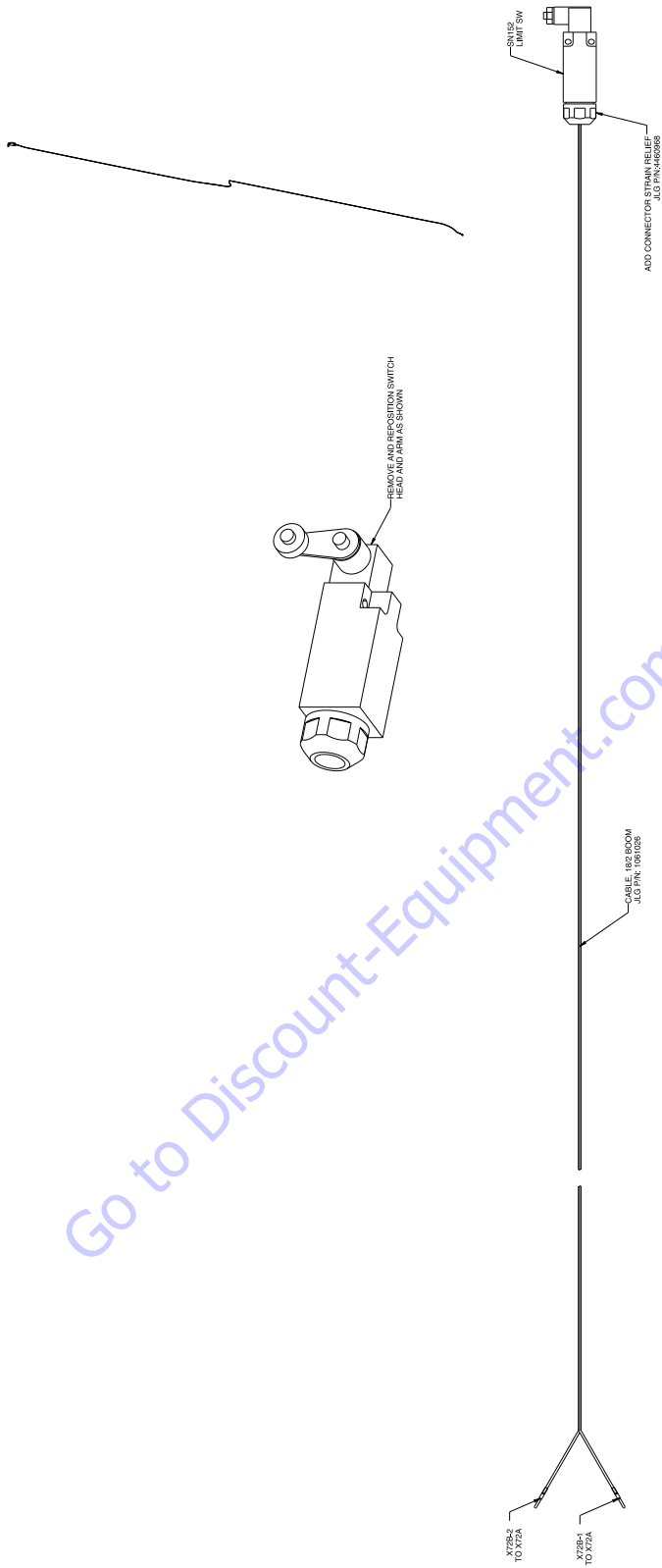


CONNECTOR PART NUMBER: 446097				X60 - TO TTABLE HARN			
CONN. POS.	WIRE LABEL	GAUGE	WIRE COLOR	TERMINAL PIN	SEAL PIN	TO	
1	WHT	16 AWG	WHT	446044	446044	SN151.D1D	
2	BLK	16 AWG	BLK	446044	446044	SN151.D2D	

CONNECTOR PART NUMBER: 446097				SN151 - LIMIT SW			
CONN. POS.	WIRE LABEL	GAUGE	WIRE COLOR	TERMINAL PIN	SEAL PIN	TO	
1	WHT	16 AWG	WHT	446044	446044	360.D1	
2	BLK	16 AWG	BLK	446044	446044	360.D2	

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Figure 7-30. Boom Limit Switch Harness



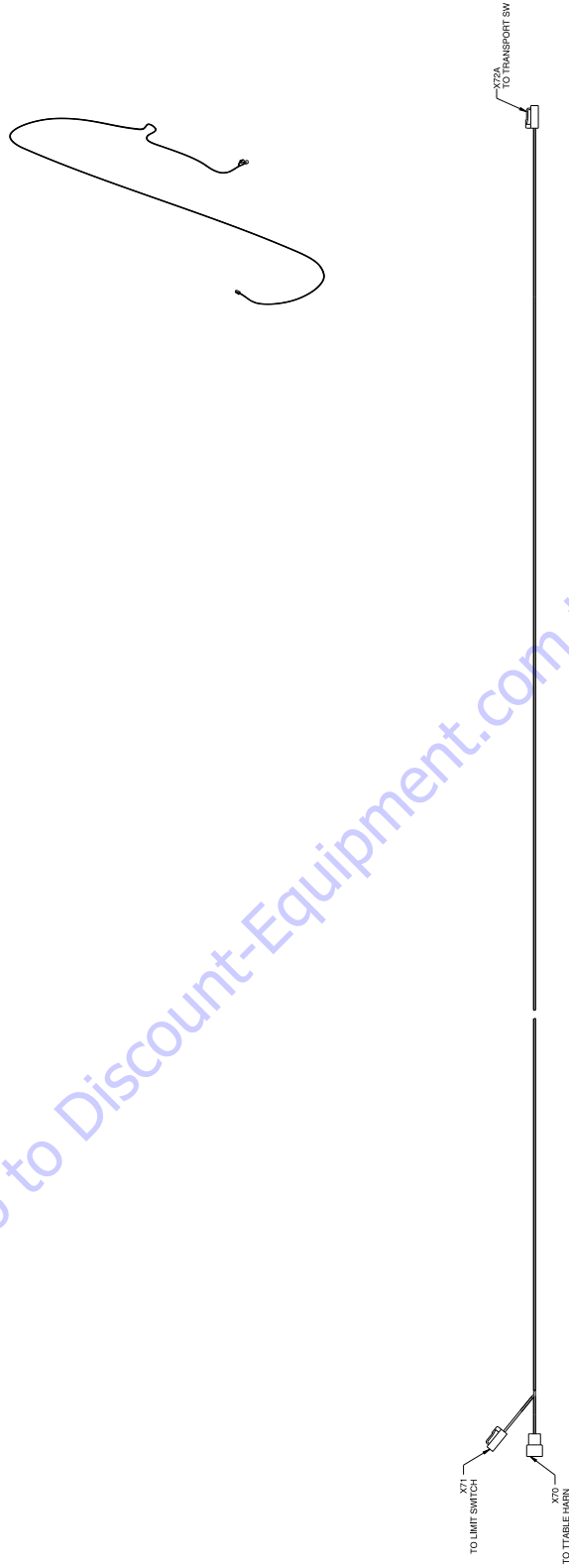
SN152 - LIMIT SW						
CONN. POS.	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN
21	WHT		18 AWG	CABLE		X72B-1 (1)
22	BLK		18 AWG	CABLE		X72B-2 (1)
INC						
INC1						

X72B-2 - TO X72A						
CONN. POS.	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN
1	BLK		18 AWG	CABLE	N/A	SN152 (22)

X72B-1 - TO X72A						
CONN. POS.	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN
1	WHT		18 AWG	CABLE	N/A	SN152 (21)

Figure 7-31. Transport Limit Switch Harness

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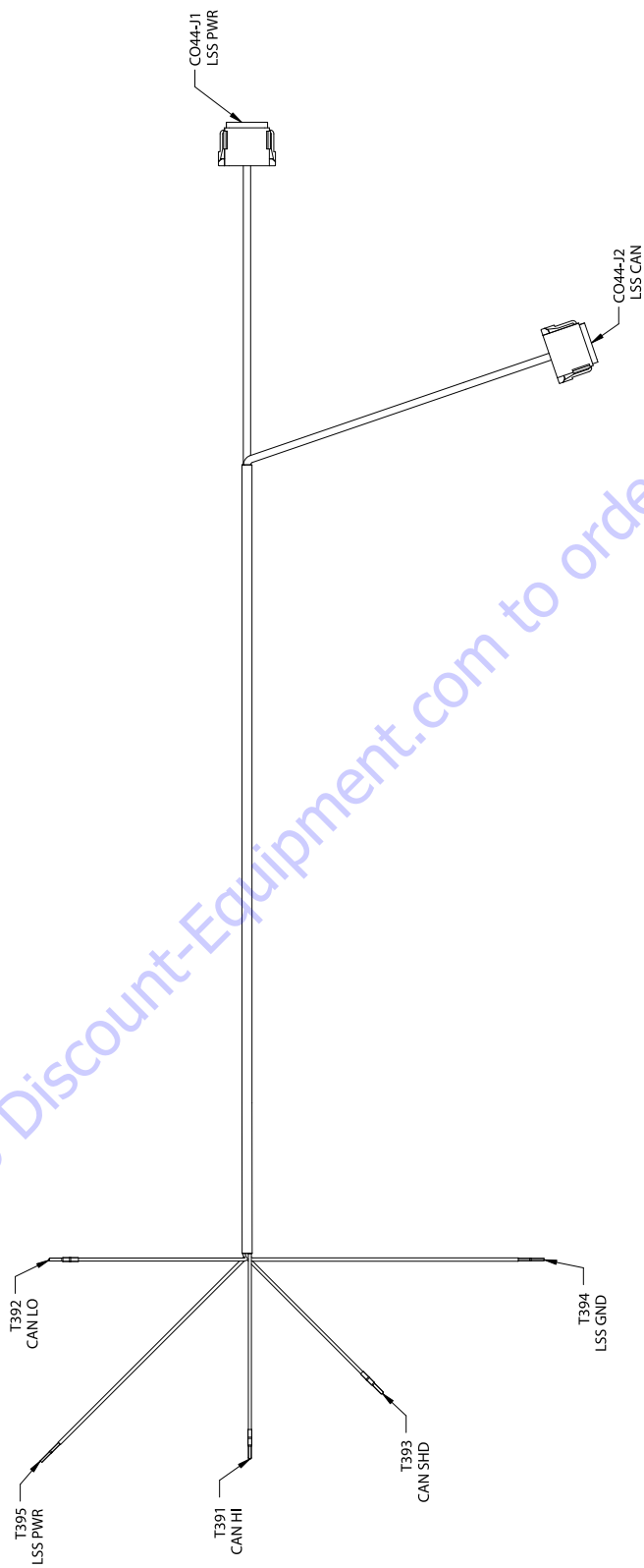
X72A - TO TRANSPORT SW						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	71-0 TRANSPORT SW	18 AWG	GXL	4460465	X71 (1)
2	BLK	70-0 TRANSPORT SW	18 AWG	GXL	4460465	X70 (2)

X71 - TO LIMIT SWITCH						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	71-0 TRANSPORT SW	18 AWG	GXL	4460465	X72A (1)
2	BLK	72-0 TRANSPORT SW	18 AWG	GXL	4460465	X70 (1)

X70 - TO TABLE HARN						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	BLK	72-0 TRANSPORT SW	18 AWG	GXL	4460464	X71 (2)
2	BLK	70-0 TRANSPORT SW	18 AWG	GXL	4460464	X72A (2)

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Figure 7-32. Transport Boom Harness



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Figure 7-33. Load Sensing System Harness (LSS) - Sheet 1 of 2

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

T394 - LSS GND							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	1-28 LSS GND	18 AWG	GXL	N/A		CO44-J1 (2)

T395 - LSS PWR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-20 LSS PWR	18 AWG	GXL	N/A		CO44-J1 (1)

T393 - CAN SHD							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	SHLD	TP CAN CABLE	20 AWG	J1939 CABLE	N/A		CO44-J2 (NC)

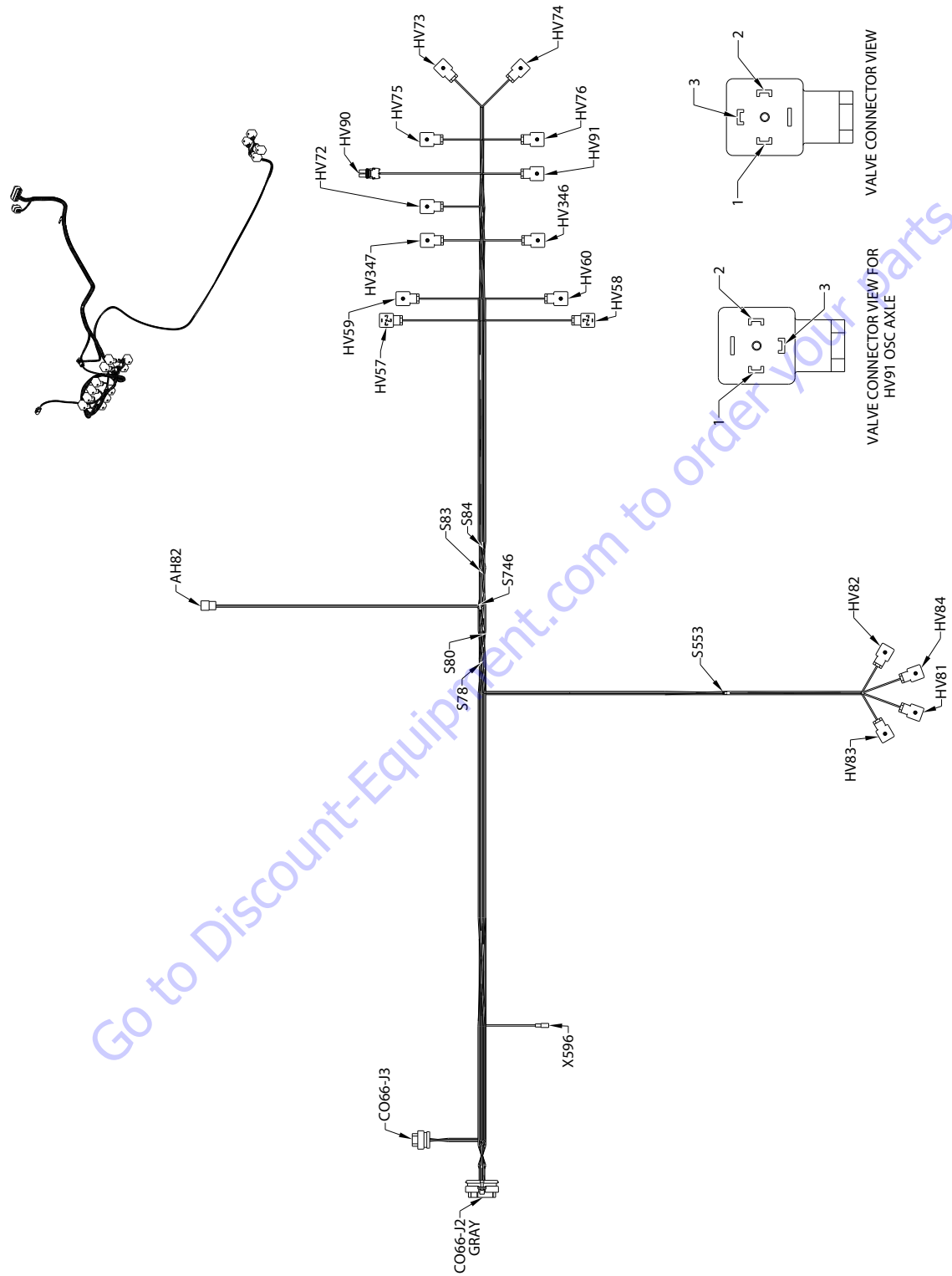
T392 - CAN LO							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	GRN	TP CAN CABLE	20 AWG	J1939 CABLE	N/A		CO44-J2 (9)

T391 - CAN HI							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	TP CAN CABLE	20 AWG	J1939 CABLE	N/A		CO44-J2 (4)

CO44-J2 - LSS CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1					4460466		
2					4460466		
3					4460466		
4	YEL	TP CAN CABLE	20 AWG	J1939 CABLE	4460944		T391 (1)
5					4460466		
6					4460466		
7					4460466		
8					4460466		
9	GRN	TP CAN CABLE	20 AWG	J1939 CABLE	4460944		T392 (1)
10					4460466		
11					4460466		
12					4460466		
NC	SHLD	TP CAN CABLE	20 AWG	J1939 CABLE	N/A		T393 (1)

CO44-J1 - LSS PWR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-20 LSS PWR	18 AWG	GXL	4460465		T395 (1)
2	WHT	1-28 LSS GND	18 AWG	GXL	4460465		T394 (1)
3					4460466		
4					4460466		
5					4460466		
6					4460466		
7					4460466		
8					4460466		
9					4460466		
10					4460466		
11					4460466		
12					4460466		

Figure 7-34. Load Sensing System Harness (LSS) - Sheet 2 of 2



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MAF21220A

Figure 7-35. Lower Valve Harness - Sheet 1 of 4



**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

CO66-J2 - GRAY					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2					
3	WHT	107-3 TELE IN	18 AWG	GXL	HV60 (1)
4					
5	WHT	155-1 AWD FWD A	18 AWG	GXL	HV81 (1)
6	WHT	1-24-11 JIB GND	18 AWG	GXL	S746 (2)
7	WHT	155-2 AWD FWD B	18 AWG	GXL	HV82 (1)
8					
9					
10	WHT	155-3 AWD REV A	18 AWG	GXL	HV83 (1)
11	WHT	101-3 MAIN LIFT UP	18 AWG	GXL	HV75 (1)
12	WHT	171-1 JIB UP	18 AWG	GXL	HV57 (1)
13					
14	WHT	1-55 AWD GND	18 AWG	GXL	S553 (2)
15	WHT	108-3 TELE OUT	18 AWG	GXL	HV59 (1)
16					
17	WHT	1-18 TELE RETURN	18 AWG	GXL	S83 (2)
18	WHT	201-2 OSC AXLE RETURN	18 AWG	GXL	HV91 (2)
19	WHT	201-1 OSC AXLE	18 AWG	GXL	HV91 (1)
20					
21	WHT	155-4 AWD REV B	18 AWG	GXL	HV84 (1)
22	WHT	102-3 MAIN LIFT DOWN	18 AWG	GXL	HV76 (1)
23	WHT	170-1 JIB DOWN	18 AWG	GXL	HV58 (1)
24	WHT	200-1 PRESS SW	18 AWG	GXL	HV90 (1)
25					
26	WHT	88-2-1 LIGHTING	16 AWG	GXL	X596 (1)
27	WHT	99-2 GROUND ALARM SIGNAL	18 AWG	GXL	AH82 (B)
28	WHT	1-18-1 STEER RETURN	18 AWG	GXL	S80 (2)
29	WHT	1-21 GROUND ALARM GND	18 AWG	GXL	AH82 (C)
30	WHT	200-2 PRESS SW RETURN	18 AWG	GXL	HV90 (2)
31	WHT	115-3 FLOW CONTROL	18 AWG	GXL	HV72 (1)
32	WHT	78-1 STEER RT	18 AWG	GXL	HV346 (1)
33	WHT	79-1 STEER LT	18 AWG	GXL	HV347 (1)
34	WHT	103-3 SWING LT	18 AWG	GXL	HV74 (1)
35	WHT	104-3 SWING RT	18 AWG	GXL	HV73 (1)

CO66-J3					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	1-19 MAIN LIFT RETURN	18 AWG	GXL	S78 (2)
3					
4	WHT	1-18-3 SWING RETURN	18 AWG	GXL	S84 (2)
5					
6	WHT	1-15 FLOW CONTROL RETURN	18 AWG	GXL	HV72 (2)
7	WHT	99-1 GROUND ALARM POWER	18 AWG	GXL	AH82 (A)
8					
9					
10					
11					
12					
13					
14					

X596 - HEAD & TAIL LT SIG					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	88-2-1 LIGHTING	16 AWG	GXL	CO66-J2 (26)

S78					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-19-1 MAIN LIFT UP GND	18 AWG	GXL	HV75 (2)
1	WHT	1-19-2 MAIN LIFT DOWN GND	18 AWG	GXL	HV76 (2)
2	WHT	1-19 MAIN LIFT RETURN	18 AWG	GXL	CO66-J3 (2)

S553					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-55-1 AWD FWD A GND	18 AWG	GXL	HV81 (2)
1	WHT	1-55-2 AWD FWD B GND	18 AWG	GXL	HV82 (2)
1	WHT	1-55-3 AWD REV A GND	18 AWG	GXL	HV83 (2)
1	WHT	1-55-4 AWD REV B GND	18 AWG	GXL	HV84 (2)
2	WHT	1-55 AWD GND	18 AWG	GXL	CO66-J2 (14)

HV83 - AWD REV A					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	155-3 AWD REV A	18 AWG	GXL	CO66-J2 (10)
2	WHT	1-55-3 AWD REV A GND	18 AWG	GXL	S553 (1)

HV81 - AWD FWD A					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	155-1 AWD FWD A	18 AWG	GXL	CO66-J2 (5)
2	WHT	1-55-1 AWD FWD A GND	18 AWG	GXL	S553 (1)

AH82 - ALARM					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	WHT	99-1 GROUND ALARM POWER	18 AWG	GXL	CO66-J3 (7)
B	WHT	99-2 GROUND ALARM SIGNAL	18 AWG	GXL	CO66-J2 (27)
C	WHT	1-21 GROUND ALARM GND	18 AWG	GXL	CO66-J2 (29)

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**Figure 7-36. Lower Valve Harness - Sheet 2 of 4**

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

HV90 - PRESSURE SW					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	200-1 PRESS SW	18 AWG	GXL	CO66-J2 (24)
2	WHT	200-2 PRESS SW RETURN	18 AWG	GXL	CO66-J2 (30)

HV57 - JIB UP					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	171-1 JIB UP	18 AWG	GXL	CO66-J2 (12)
2	WHT	1-24-6 JIB UP GND	18 AWG	GXL	S746 (1)

HV58 - JIB DOWN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	170-1 JIB DOWN	18 AWG	GXL	CO66-J2 (23)
2	WHT	1-24-7 JIB DOWN GND	18 AWG	GXL	S746 (1)

HV60 - TELESCOPE IN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	107-3 TELE IN	18 AWG	GXL	CO66-J2 (3)
2	WHT	1-18-9 TELE IN GND	18 AWG	GXL	S83 (1)

HV82 - AWD FWD B					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	155-4 AWD FWD B	18 AWG	GXL	CO66-J2 (7)
2	WHT	1-55-2 AWD FWD B GND	18 AWG	GXL	S553 (1)

HV84 - AWD REV B					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	155-4 AWD REV B	18 AWG	GXL	CO66-J2 (21)
2	WHT	1-55-4 AWD REV B GND	18 AWG	GXL	S553 (1)

HV91 - OSC AXLE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	201-1 OSC AXLE	18 AWG	GXL	CO66-J2 (19)
2	WHT	201-2 OSC AXLE RETURN	18 AWG	GXL	CO66-J2 (18)

HV74 - SWING LEFT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	103-3 SWING LT	18 AWG	GXL	CO66-J2 (34)
2	WHT	1-18-10 SWING LEFT GND	18 AWG	GXL	S84 (1)

HV346 - STEER RT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	78-1 STEER RT	18AWG	GXL	CO66-J2 (32)
2	WHT	1-18-7 STEER RIGHT GND	18AWG	GXL	S80 (1)

HV76 - MAIN LIFT DOWN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	102-3 MAIN LIFT DOWN	18 AWG	GXL	CO66-J2 (22)
2	WHT	1-19-2 MAIN LIFT DOWN GND	18 AWG	GXL	S78 (1)

S80					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-18-7 STEER RIGHT GND	18 AWG	GXL	HV346 (2)
1	WHT	1-18-8 STEER LEFT GND	18 AWG	GXL	HV347 (2)
2	WHT	1-18-1 STEER RETURN	18 AWG	GXL	CO66-J2 (28)

S83					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-18-6 TELE OUT GND	18 AWG	GXL	HV59 (2)
1	WHT	1-18-9 TELE IN GND	18 AWG	GXL	HV60 (2)
2	WHT	1-18 TELE RETURN	18 AWG	GXL	CO66-J2 (17)

S84					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-18-10 SWING LEFT GND	18 AWG	GXL	HV74 (2)
1	WHT	1-18-4 SWING RIGHT GND	18 AWG	GXL	HV73 (2)
2	WHT	1-18-3 SWING RETURN	18 AWG	GXL	CO66-J3 (4)

S746					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	1-24-6 JIB UP GND	18 AWG	GXL	HV57 (2)
1	WHT	1-24-7 JIB DOWN GND	18 AWG	GXL	HV58 (2)
2	WHT	1-24-11 JIB GND	18 AWG	GXL	CO66-J2 (6)

HV59 - TELESCOPE OUT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	108-3 TELE OUT	18 AWG	GXL	CO66-J2 (15)
2	WHT	1-18-6 TELE OUT GND	18 AWG	GXL	S83 (1)

HV347 - STEER LT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	79-1 STEER LT	18 AWG	GXL	CO66-J2 (33)
2	WHT	1-18-8 STEER LEFT GND	18 AWG	GXL	S80 (1)

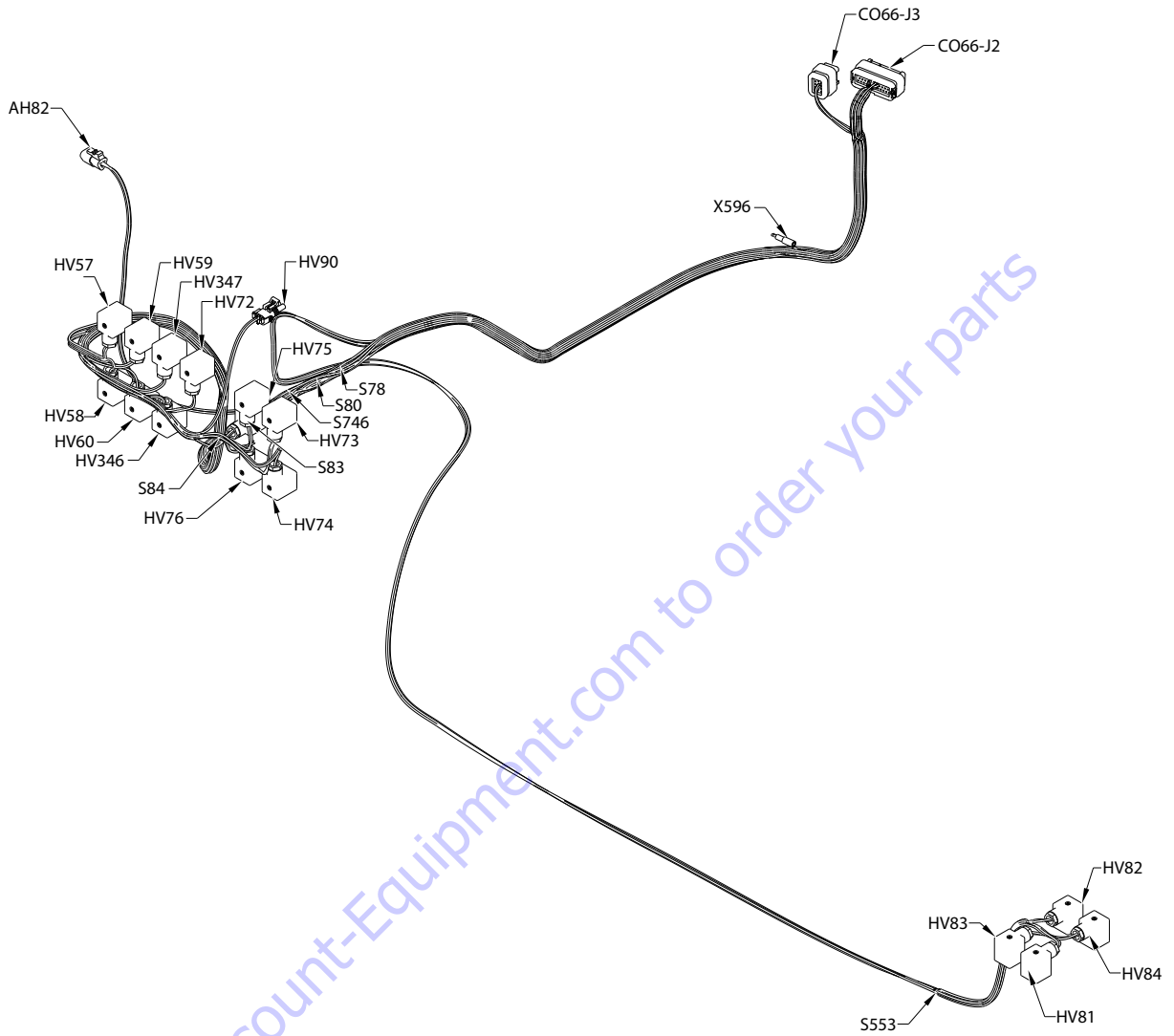
HV72 - FLOW CONTROL					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	115-3 FLOW CONTROL	18 AWG	GXL	CO66-J2 (31)
2	WHT	1-15 FLOW CONTROL RETURN	18 AWG	GXL	CO66-J3 (6)

HV75 - MAIN LIFT UP					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	101-3 MAIN LIFT UP	18 AWG	GXL	CO66-J2 (11)
2	WHT	1-19-1 MAIN LIFT UP GND	18 AWG	GXL	S78 (1)

HV73 - SWING RIGHT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	104-3 SWING RT	18 AWG	GXL	CO66-J2 (35)
2	WHT	1-18-4 SWING RIGHT GND	18 AWG	GXL	S84 (1)

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**Figure 7-37. Lower Valve Harness - Sheet 3 of 4**



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Figure 7-38. Lower Valve Harness - Sheet 4 of 4

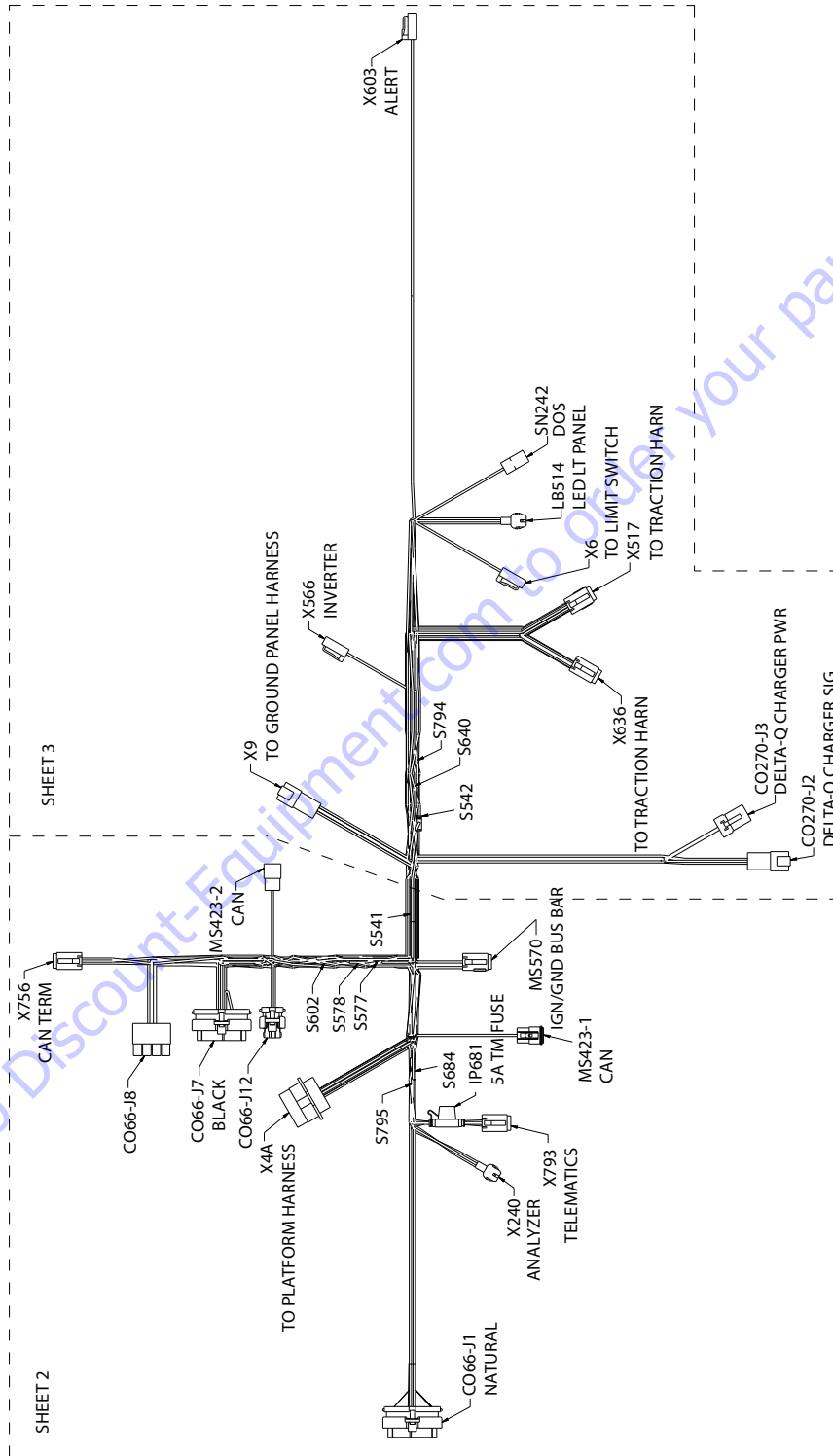
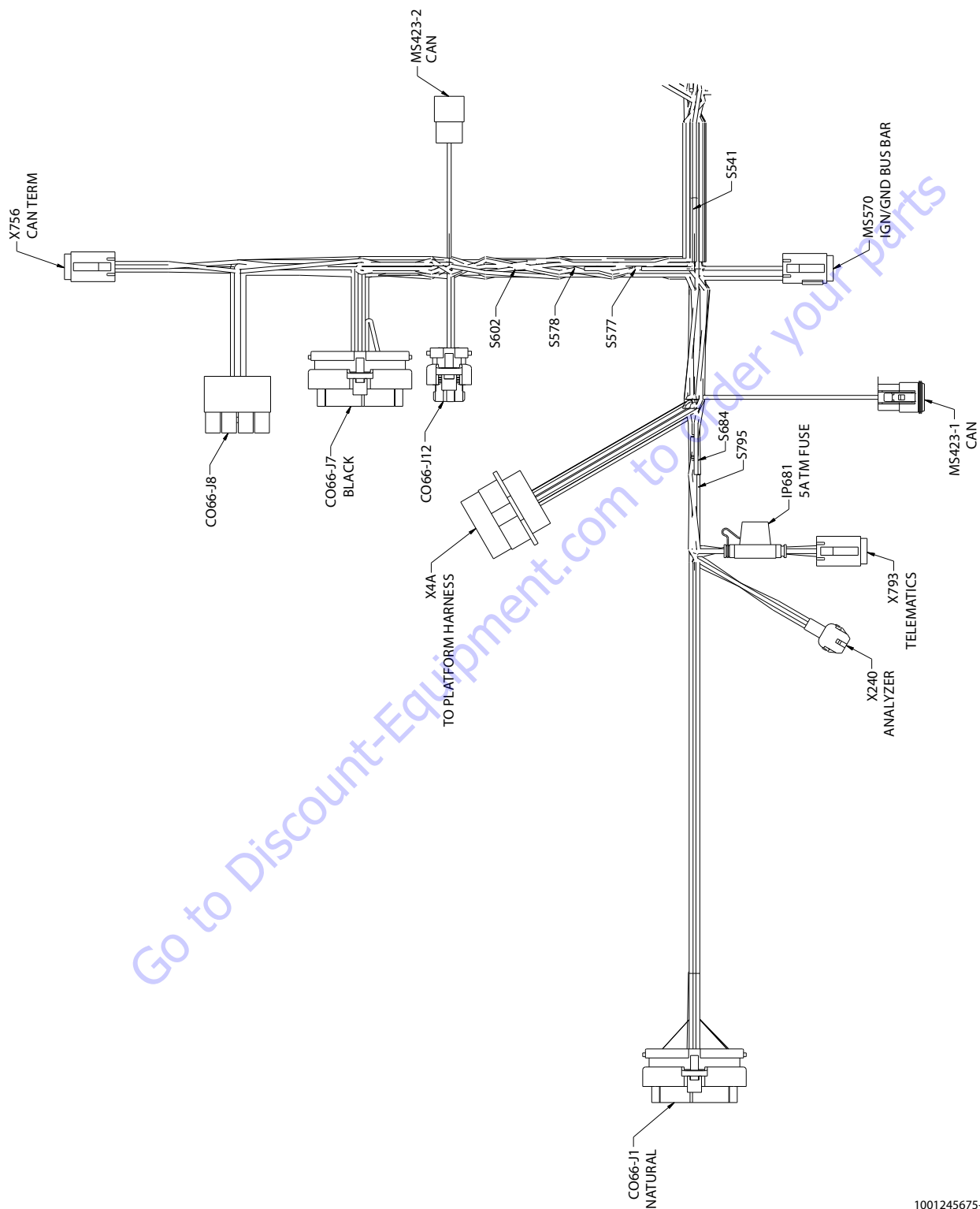


Figure 7-39. Turntable Harness - Sheet 1 of 7

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Figure 7-40. Turntable Harness - Sheet 2 of 7

1001245675-B  
MAF18170B

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

CO66-J1 - NATURAL					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	WHT	300-1 ALERT PWR	18 AWG	GXL	X603 (1)
3					
4	BLK	300-2 ALERT GND	18 AWG	GXL	X603 (2)
5					
6					
7					
8	WHT	4-90 CONFIG	18 AWG	GXL	CO66-J1 (35)
9					
10					
11					
12					
13	WHT	2-3-2 DRIVE ENABLE RELAY	18 AWG	GXL	X517 (3)
14					
15					
16					
17					
18					
19	WHT	2-20-1 DRIVE ENABLE RLY GND	18 AWG	GXL	X517 (2)
20					
21					
22					
23					
24					
25					
26					
27					
28	WHT	87-1 ANALYZER PWR	18 AWG	GXL	X240 (1)
29	WHT	87-2 ANALYZER RS-232 RX	18 AWG	GXL	X240 (2)
30	WHT	87-3 ANALYZER RS-232 TX	18 AWG	GXL	X240 (3)
31	WHT	87-4 ANALYZER GND	18 AWG	GXL	X240 (4)
32					
33					
34					
35	WHT	4-90 CONFIG	18 AWG	GXL	CO66-J1 (8)

CO66-J7 - BLACK					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	2-10 PLAT TX	18 AWG	GXL	S602 (1)
2	WHT	2-10-2 PLAT TX	18 AWG	GXL	S602 (1)
3	WHT	2-7 GMODE SELECT	18 AWG	GXL	X9 (6)
4	WHT	85-3 BOOM ELEV SW1	18 AWG	GXL	X6 (2)
5					
6	WHT	CAN TERM JUMPER	18 AWG	GXL	CO66-J7 (17)
7					
8					
9					
10					
11	WHT	85-7-2 DOS LIMIT SW PWR	18 AWG	GXL	SN242 (2)
12					
13	YEL	80-0 CAN1 HIGH	18 AWG	GXL	S577 (1)
14	WHT	2-11 GMODE ATTAINED	18 AWG	GXL	X4A (11)
15	WHT	131-2 FOOTSWITCH	18 AWG	GXL	X4A (6)
16					
17	WHT	CAN TERM JUMPER	18 AWG	GXL	CO66-J7 (6)
18					
19					
20					
21					
22					
23					
24	GRN	81-0 CAN1 LOW	18 AWG	GXL	S578 (1)
25	BLK	4-55	18 AWG	GXL	X517 (8)
26					
27					
28					
29	YEL	5-50	18 AWG	GXL	X517 (6)
30	WHT	85 BOOM LIMIT SW PWR	18 AWG	GXL	X6 (1)
31					
32	WHT	85-7-1 DOS LIMIT SW	18 AWG	GXL	SN242 (1)
33					
34					
35					

X756 - CAN TERM					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	83-1 CAN2 HI	18 AWG	GXL	X636 (1)
2	YEL	83-1-1 CAN2 HI	18 AWG	GXL	CO66-J12 (3)
3	GRN	84-1-1 CAN2 LO	18 AWG	GXL	CO66-J12 (4)
4	GRN	84-1 CAN2 LO	18 AWG	GXL	X636 (2)

CO66-J8					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	1-10 INSTRUMENT GND	12 AWG	GXL	X517 (4)
2	YEL	5-10-1 IGN	14 AWG	GXL	S541 (1)
3	BLK	1-5 PLAT GND	12 AWG	GXL	X4A (16)
4	YEL	3-8 PLATFORM PWR	12 AWG	GXL	X4A (12)

CO66-J12					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2					
3	YEL	83-1-1 CAN2 HI	18 AWG	GXL	X756 (2)
4	GRN	84-1-1 CAN2 LO	18 AWG	GXL	X756 (3)
5					
6					
7					
8	WHT	80-0 MSSO	18 AWG	GXL	X9 (7)
NC					

IP681 - 5A TM FUSE					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK		14 AWG	GXL	S684 (2)
2	BLK		14 AWG	GXL	X793 (3)

X4A - TO PLATFORM HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1					
2	GRN	81-2 CAN1 LOW	18 AWG	GXL	MS423-1 (B)
3	YEL	80-2 CAN1 HIGH	18 AWG	GXL	MS423-1 (A)
4	WHT	2-10-1 PLAT TX	18 AWG	GXL	S602 (2)
5					
6	WHT	131-2 FOOTSWITCH	18 AWG	GXL	CO66-J7 (15)
7	WHT	2-13-2 IGN	18 AWG	GXL	MS570 (7)
8					
9	WHT	2-6-1 PMODE SELECT	18 AWG	GXL	S795 (1)
10	YEL	5-6	14 AWG	GXL	MS570 (5)
11	WHT	2-11 GMODE ATTAINED	18 AWG	GXL	CO66-J7 (14)
12	YEL	3-8 PLATFORM PWR	12 AWG	GXL	CO66-J8 (4)
13	WHT	2-8 PMODE SELECT IGN	18 AWG	GXL	X9 (3)
14					
15	YEL	3-4-3 IGNITION	16 AWG	GXL	S542 (1)
16	BLK	1-5 PLAT GND	12 AWG	GXL	CO66-J8 (3)
17					
18	BLK	4-20	14 AWG	GXL	MS570 (2)
19					

S684					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	5-10-6 IGN	14 AWG	GXL	S541 (1)
2	BLK		14 AWG	GXL	IP681 (1)

**Figure 7-41. Turntable Harness - Sheet 3 of 7**

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

MS423-2 - CAN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	80-1 CAN1 HIGH	18 AWG	GXL	S577 (1)
B	GRN	81-1 CAN1 LOW	18 AWG	GXL	S578 (1)
C					

X793 - TELEMATICS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	3-4-1-2 UNSW IGN	18 AWG	GXL	S794 (2)
2	BLK	1-8-2 GND	18 AWG	GXL	MS570 (11)
3	BLK		14 AWG	GXL	IP681 (2)
4	WHT	2-6-2 PMODE SELECT	18 AWG	GXL	S795 (2)

MS423-1 - CAN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
A	YEL	80-2 CAN1 HIGH	18 AWG	GXL	X4A (3)
B	GRN	81-2 CAN1 LOW	18 AWG	GXL	X4A (2)
C					

X240 - ANALYZER					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	87-1 ANALYZER PWR	18 AWG	GXL	CO66-J1 (28)
2	WHT	87-2 ANALYZER RS-232 RX	18 AWG	GXL	CO66-J1 (29)
3	WHT	87-3 ANALYZER RS-232 TX	18 AWG	GXL	CO66-J1 (30)
4	WHT	87-4 ANALYZER GND	18 AWG	GXL	CO66-J1 (31)

S602					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	2-10 PLAT TX	18 AWG	GXL	CO66-J7 (1)
1	WHT	2-10-2 PLAT TX	18 AWG	GXL	CO66-J7 (2)
2	WHT	2-10-1 PLAT TX	18 AWG	GXL	X4A (4)

S541					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	5-10-1 IGN	14 AWG	GXL	CO66-J8 (2)
1	YEL	5-10-6 IGN	14 AWG	GXL	S684 (1)
2	YEL	5-10-2 IGN	14 AWG	GXL	X517 (9)
2	YEL	5-10-5 IGN	14 AWG	GXL	X9 (2)

S578					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	GRN	81-0 CAN1 LOW	18 AWG	GXL	CO66-J7 (24)
1	GRN	81-1 CAN1 LOW	18 AWG	GXL	MS423-2 (B)
2	GRN	81-2 CAN1 LOW	18 AWG	GXL	X517 (12)

S795					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	2-6 PMODE SELECT	18 AWG	GXL	X9 (5)
1	WHT	2-6-1 PMODE SELECT	18 AWG	GXL	X4A (9)
2	WHT	2-6-2 PMODE SELECT	18 AWG	GXL	X793 (4)

MS570 - IGN/GND BUS BAR					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	BLK	4-0-3 INST GND	14 AWG	GXL	X517 (10)
2	BLK	4-20	14 AWG	GXL	X4A (18)
3					
4	YEL	3-5 SWITCHED PWR	12 AWG	GXL	X517 (7)
5	YEL	5-6	14 AWG	GXL	X4A (10)
6					
7	WHT	2-13-2 IGN	18 AWG	GXL	X4A (7)
8					
9					
10					
11	BLK	1-8-2 GND	18 AWG	GXL	X793 (2)
12					

S577					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	80-0 CAN1 HIGH	18 AWG	GXL	CO66-J7 (13)
1	YEL	80-1 CAN1 HIGH	18 AWG	GXL	MS423-2 (A)
2	YEL	80-2 CAN1 HIGH	18 AWG	GXL	X517 (11)

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**Figure 7-42. Turntable Harness - Sheet 4 of 7**

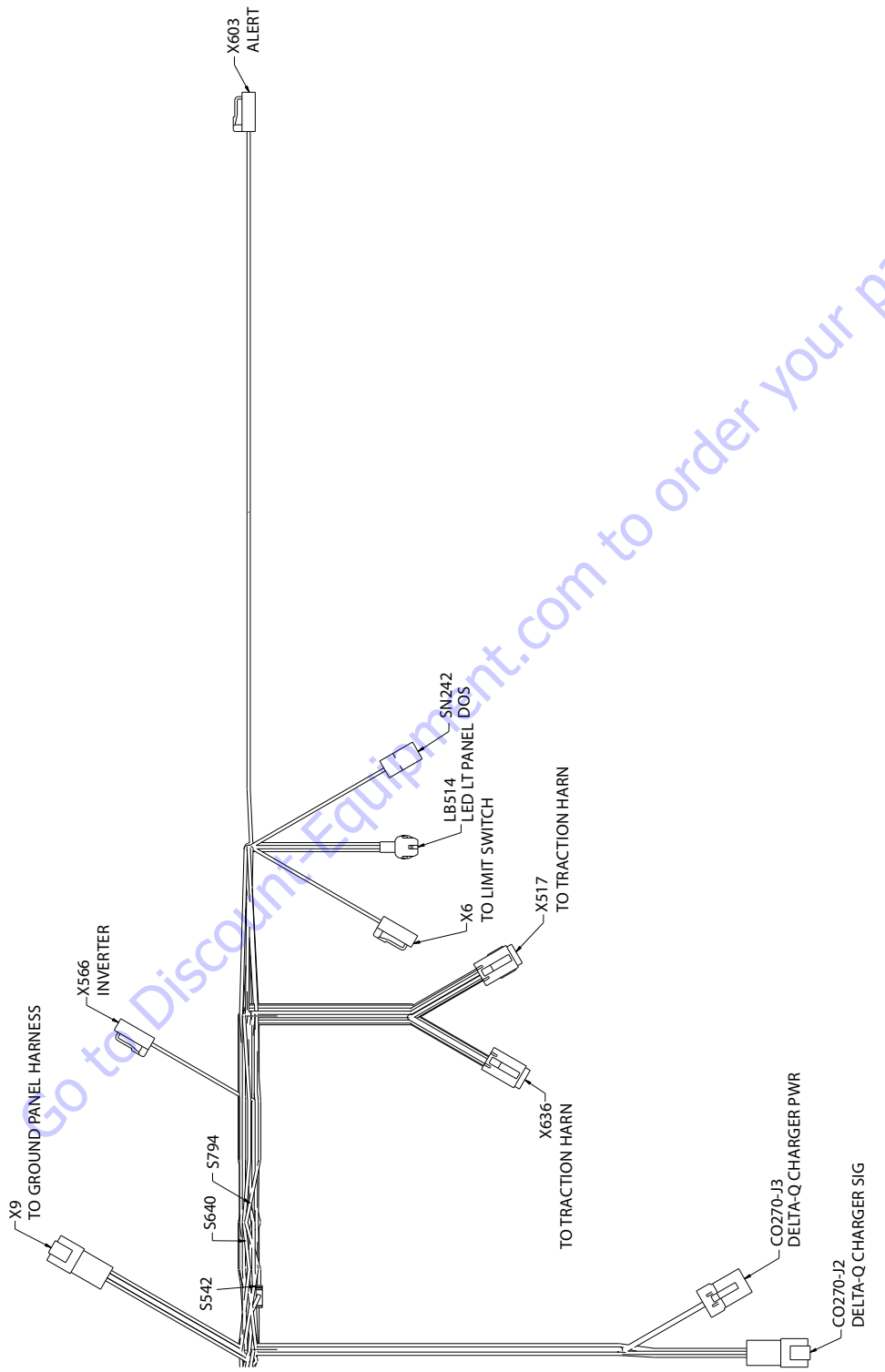


Figure 7-43. Turntable Harness - Sheet 5 of 7

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

X9 - TO GROUND PANEL HARNESS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	3-4-1-1 UNSW IGN	12 AWG	GXL	S794 (2)
2	YEL	5-10-5 IGN	14 AWG	GXL	S541 (2)
3	WHT	2-8 PMODE SELECT IGN	18 AWG	GXL	X4A (13)
4	YEL	3-4-2 IGNITION	18 AWG	GXL	S542 (1)
5	WHT	2-6 PMODE SELECT	18 AWG	GXL	S795 (1)
6	WHT	2-7 GMODE SELECT	18 AWG	GXL	CO66-J7 (3)
7	WHT	80-0 MSSO	18 AWG	GXL	CO66-J12 (8)
8					

X566 - INVERTER					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	6-2-5 INVERTER	18 AWG	GXL	S640 (2)
2					

X603 - ALERT					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	300-1 ALERT PWR	18 AWG	GXL	CO66-J1 (2)
2	BLK	300-2 ALERT GND	18 AWG	GXL	CO66-J1 (4)

S542					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	3-4-2 IGNITION	18 AWG	GXL	X9 (4)
1	YEL	3-4-3 IGNITION	16 AWG	GXL	X4A (15)
2	YEL	3-4-4 IGN	18 AWG	GXL	X517 (5)

S640					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	6-2-2 IGN 48 VOLT	18 AWG	GXL	CO270-J2 (8)
2	YEL	6-2-5 INVERTER	18 AWG	GXL	X566 (1)
2	YEL	6-2-6 IGN 48 VOLT	18 AWG	GXL	X636 (6)

S794					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	3-4-1 UNSW IGN	12 AWG	GXL	X517 (1)
2	RED	3-4-1-1 UNSW IGN	12 AWG	GXL	X9 (1)
2	RED	3-4-1-2 UNSW IGN	18 AWG	GXL	X793 (1)

CO270-J2 - DELTA-Q CHARGER SIG					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	45-3-3 CHARGING STAT	18 AWG	GXL	X636 (4)
2					
3	WHT	205 RED LED	18 AWG	GXL	LB514 (4)
4	WHT	206 YEL LED	18 AWG	GXL	LB514 (2)
5	WHT	4-56	18 AWG	GXL	LB514 (1)
6	WHT	207 GRN LED	18 AWG	GXL	LB514 (3)
7					
8	YEL	6-2-2 IGN 48 VOLT	18 AWG	GXL	S640 (1)

X517 - TO TRACTION HARN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	3-4-1 UNSW IGN	12 AWG	GXL	S794 (1)
2	WHT	2-20-1 DRIVE ENABLE RLY GND	18 AWG	GXL	CO66-J1 (19)
3	WHT	2-3-2 DRIVE ENABLE RELAY	18 AWG	GXL	CO66-J1 (13)
4	BLK	1-10 INSTRUMENT GND	12 AWG	GXL	CO66-J8 (1)
5	YEL	3-4-4 IGN	18 AWG	GXL	S542 (2)
6	YEL	5-50	18 AWG	GXL	CO66-J7 (29)
7	YEL	3-5 SWITCHED PWR	12 AWG	GXL	MS570 (4)
8	BLK	4-55	18 AWG	GXL	CO66-J7 (25)
9	YEL	5-10-2 IGN	14 AWG	GXL	S541 (2)
10	BLK	4-0-3 INST GND	14 AWG	GXL	MS570 (1)
11	YEL	80-2 CAN1 HIGH	18 AWG	GXL	S577 (2)
12	GRN	81-2 CAN1 LOW	18 AWG	GXL	S578 (2)

X636 - TO TRACTION HARN					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	YEL	83-1 CAN2 HI	18 AWG	GXL	X756 (1)
2	GRN	84-1 CAN2 LO	18 AWG	GXL	X756 (4)
3	BLK	46-2 B-	12 AWG	GXL	CO270-J3 (3)
4	WHT	45-3-3 CHARGING STAT	18 AWG	GXL	CO270-J2 (1)
5	RED	45 B+	12 AWG	GXL	CO270-J3 (1)
6	YEL	6-2-6 IGN 48 VOLT	18 AWG	GXL	S640 (2)

SN242 - DOS					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	85-7-1 DOS LIMIT SW	18 AWG	GXL	CO66-J7 (32)
2	WHT	85-7-2 DOS LIMIT SW PWR	18 AWG	GXL	CO66-J7 (11)

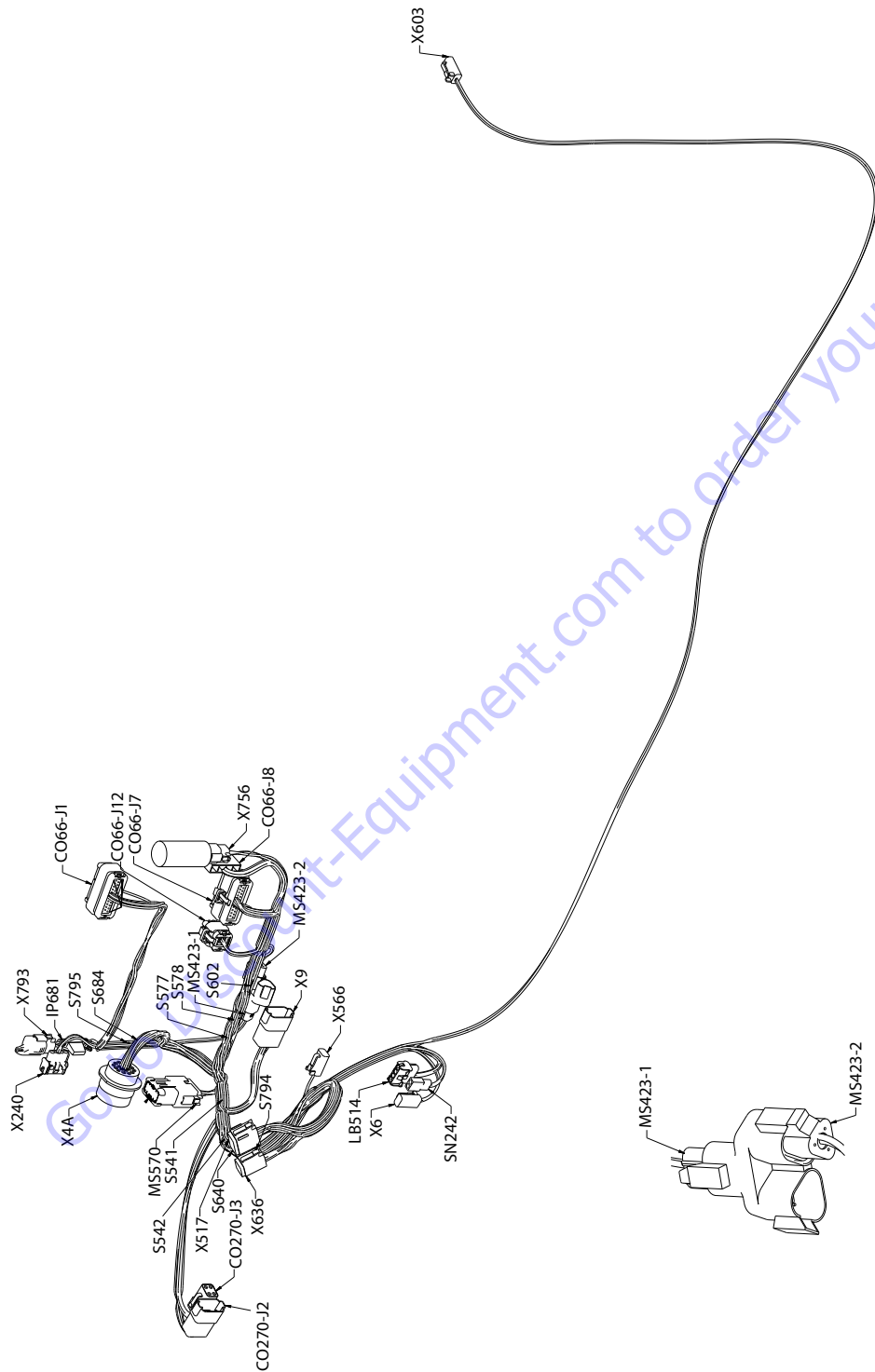
LB514 - LED LT PANEL					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	4-56	18 AWG	GXL	CO270-J2 (5)
2	WHT	206 YEL LED	18 AWG	GXL	CO270-J2 (4)
3	WHT	207 GRN LED	18 AWG	GXL	CO270-J2 (6)
4	WHT	205 RED LED	18 AWG	GXL	CO270-J2 (3)

X6 - TO LIMIT SWITCH					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	WHT	85 BOOM LIMIT SW PWR	18 AWG	GXL	CO66-J7 (30)
2	WHT	85-3 BOOM ELEV SW1	18 AWG	GXL	CO66-J7 (4)

CO270-J3 - DELTA-Q CHARGER PWR					
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TO
1	RED	45 B+	12 AWG	GXL	X636 (5)
2					
3	BLK	46-2 B-	12 AWG	GXL	X636 (3)
4					

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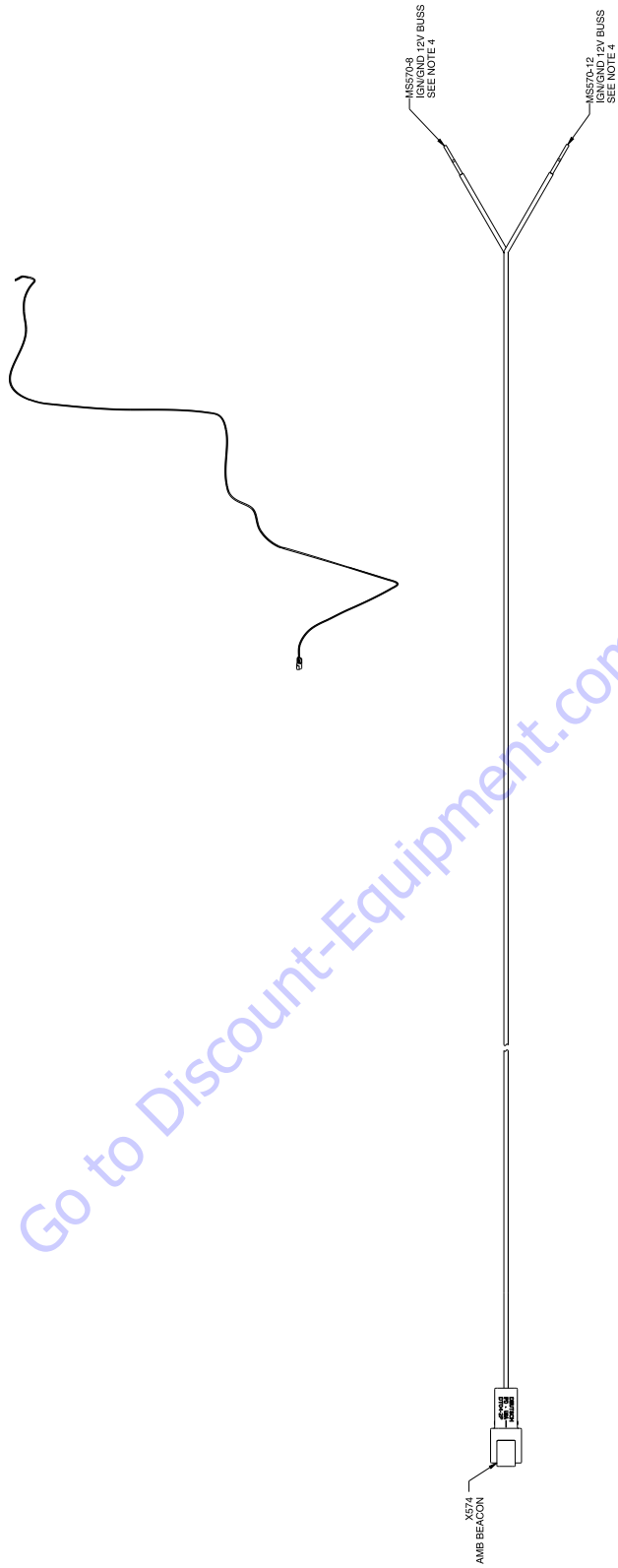
**Figure 7-44. Turntable Harness - Sheet 6 of 7**



CAN CONNECTION TO GROUND PANEL HARNESS

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Figure 7-45. Turntable Harness - Sheet 7 of 7



MS570-12 - IGN/GND 12V BUSS						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	BLK	1-8-1 GND	18 AWG	GXL	N/A	X574 (2)

X574 - AMB BEACON						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	2-1-3 STROBE	18 AWG	GXL	4460465	MS570-8 (1)
2	BLK	1-8-1 GND	18 AWG	GXL	4460465	MS570-12 (1)

MS570-8 - IGN/GND 12V BUSS						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	2-1-3 STROBE	18 AWG	GXL	N/A	X574 (1)

Figure 7-46. Amber Beacon Harness

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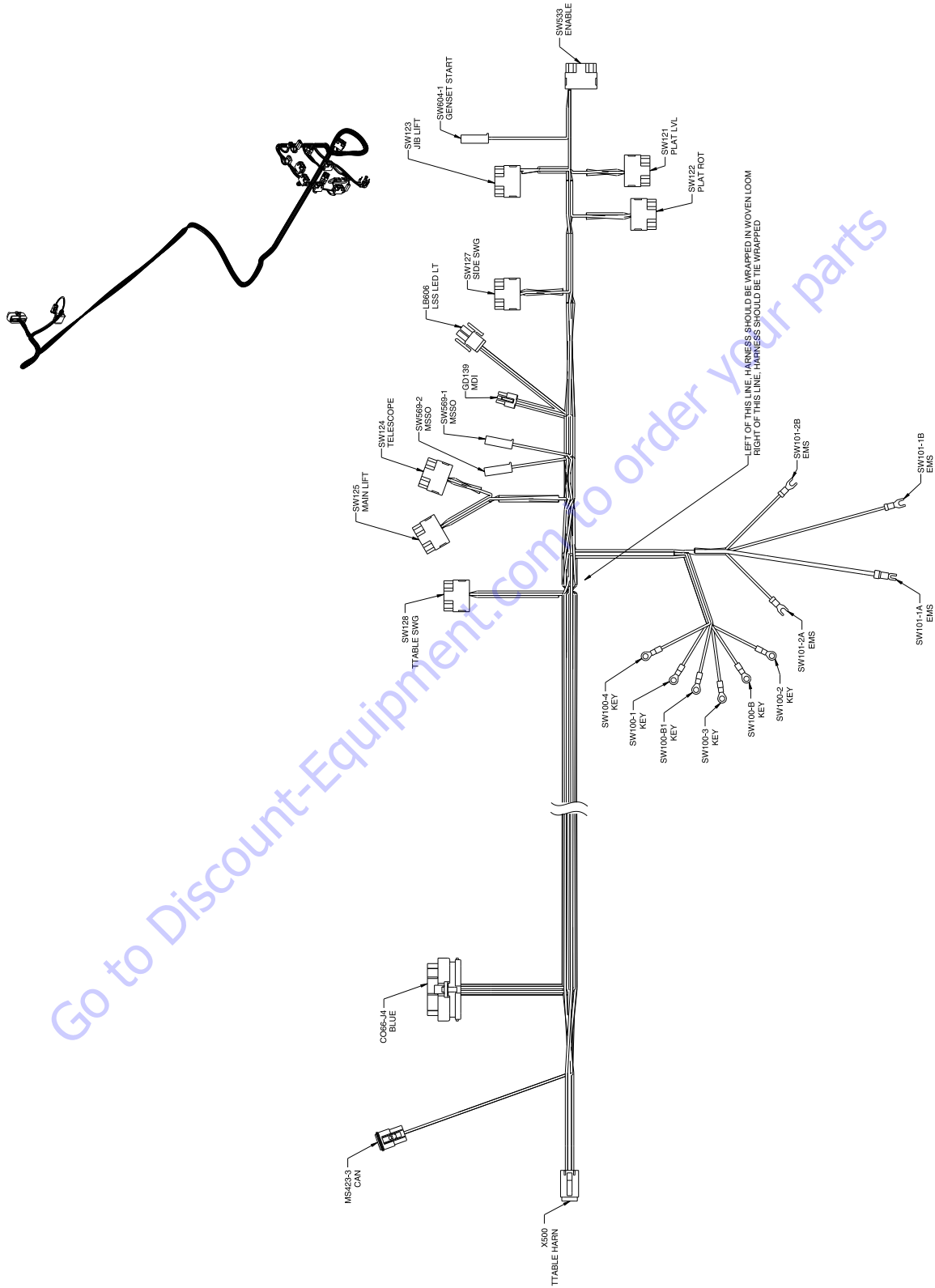


Figure 7-47. Ground Panel Harness - Sheet 1 of 3

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

CO66-J4 - BLUE							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1					4460905		
2					4460905		
3					4460905		
4					4460905		
5	WHT	114-2 PLAT LVL DN	18 AWG	GXL	4460871		SW121 (3)
6	WHT	112-2 PLAT ROT LEFT	18 AWG	GXL	4460871		SW122 (3)
7	WHT	107-2 TELE IN	18 AWG	GXL	4460871		SW124 (3)
8	WHT	110-2 JIB DN	18 AWG	GXL	4460871		SW123 (3)
9	WHT	117-2 SIDESWING LEFT	18 AWG	GXL	4460871		SW127 (3)
10					4460905		
11					4460905		
12					4460905		
13					4460905		
14	WHT	1-128 LSS LAMP	18 AWG	GXL	4460871		LB606 (1)
15					4460905		
16	WHT	137 FUNCTIONS ENABLED	18 AWG	GXL	4460871		SW533 (1)
17	WHT	113-2 PLAT LVL UP	18 AWG	GXL	4460871		SW121 (1)
18	WHT	111-2 PLAT ROT RIGHT	18 AWG	GXL	4460871		SW122 (1)
19	WHT	106-2 JIB UP	18 AWG	GXL	4460871		SW123 (1)
20	WHT	119-2 SIDESWING RIGHT	18 AWG	GXL	4460871		SW127 (1)
21					4460905		
22					4460905		
23	WHT	101-2 MAIN LIFT UP	18 AWG	GXL	4460871		SW125 (1)
24	WHT	3-21 METER PWR	18 AWG	GXL	4460871		GD139 (1)
25	WHT	3-15 SW POWER	18 AWG	GXL	4460871		SW128 (2)
26					4460905		
27					4460905		
28					4460905		
29					4460905		
30	WHT	108-2 TELE OUT	18 AWG	GXL	4460871		SW124 (1)
31	BLK	1-31 INDICATOR GND	18 AWG	GXL	4460871		LB606 (2)
32	BLK	1-32 METER GND	18 AWG	GXL	4460871		GD139 (2)
33	WHT	102-2 MAIN LIFT DN	18 AWG	GXL	4460871		SW125 (3)
34	WHT	103-2 SWING LEFT	18 AWG	GXL	4460871		SW128 (3)
35	WHT	104-2 SWING RIGHT	18 AWG	GXL	4460871		SW128 (1)

SW124 - TELESCOPE							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	108-2 TELE OUT	18 AWG	GXL	1001159186		CO66-J4 (30)
2	WHT	3-15-3 SW POWER	18 AWG	GXL	4460419		SW125 (2)
2	WHT	3-15-4 SW POWER	18 AWG	GXL	4460419		SW122 (2)
3	WHT	107-2 TELE IN	18 AWG	GXL	1001159186		CO66-J4 (7)
4							
5							
6							

SW127 - SIDE SWG							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	118-2 SIDESWING RIGHT	18 AWG	GXL	1001159186		CO66-J4 (20)
2	WHT	3-15-7 SW POWER	18 AWG	GXL	4460419		SW123 (2)
2	WHT	3-15-8 SW POWER	18 AWG	GXL	4460419		SW128 (2)
3	WHT	117-2 SIDESWING LEFT	18 AWG	GXL	1001159186		CO66-J4 (9)
4							
5							
6							

SW122 - PLAT ROT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	111-2 PLAT ROT RIGHT	18 AWG	GXL	1001159186		CO66-J4 (18)
2	WHT	3-15-4 SW POWER	18 AWG	GXL	4460419		SW124 (2)
2	WHT	3-15-5 SW POWER	18 AWG	GXL	4460419		SW121 (2)
3	WHT	112-2 PLAT ROT LEFT	18 AWG	GXL	1001159186		CO66-J4 (6)
4							
5							
6							

MS423-3-CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
A	YEL	80-3 CAN1 HIGH	18 AWG	GXL	4460944		GD139 (4)
B	GRN	81-3 CAN1 LOW	18 AWG	GXL	4460944		GD139 (3)
C					4460466		

SW123 - JIB LIFT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	109-2 JIB UP	18 AWG	GXL	1001159186		CO66-J4 (19)
2	WHT	3-15-6 SW POWER	18 AWG	GXL	4460419		SW121 (2)
2	WHT	3-15-7 SW POWER	18 AWG	GXL	4460419		SW127 (2)
3	WHT	110-2 JIB DN	18 AWG	GXL	1001159186		CO66-J4 (8)
4							
5							
6							

X500 - TTABLE HARN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	2-41 IGNITION	12 AWG	GXL	100116692		SW101-1A (1A)
2	RED	2-5-1 SWITCHED IGNITION	18 AWG	GXL	100116692		SW101-1B (1B)
3	WHT	2-8 P/MODE SELECTION	18 AWG	GXL	100116692		SW100-2 (1)
4	WHT	2-20 G/MODE IGNITION	18 AWG	GXL	100116692		SW100-4 (1)
5	WHT	2-6 P/MODE SELECT	18 AWG	GXL	100116692		SW100-1 (1)
6	WHT	2-7 G/MODE	18 AWG	GXL	100116692		SW100-3 (1)
7	WHT	118-1 MSSO	18 AWG	GXL	100116692		SW569-2 (1)
8					4460466		

SW121 - PLAT LVL							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	113-2 PLAT LVL UP	18 AWG	GXL	1001159186		CO66-J4 (17)
2	WHT	3-15-5 SW POWER	18 AWG	GXL	4460419		SW122 (2)
2	WHT	3-15-6 SW POWER	18 AWG	GXL	4460419		SW123 (2)
3	WHT	114-2 PLAT LVL DN	18 AWG	GXL	1001159186		CO66-J4 (5)
4							
5							
6							

SW128 - TTABLE SWG							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	104-2 SWING RIGHT	18 AWG	GXL	1001159186		CO66-J4 (35)
2	WHT	3-15 SW POWER	18 AWG	GXL	4460419		CO66-J4 (25)
2	WHT	3-15-8 SW POWER	18 AWG	GXL	4460419		SW127 (2)
3	WHT	103-2 SWING LEFT	18 AWG	GXL	1001159186		CO66-J4 (34)
4							
5							
6							

SW533 - ENABLE							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	137 FUNCTIONS ENABLED	18 AWG	GXL	1001159186		CO66-J4 (16)
2	WHT	3-15-1 SW POWER	18 AWG	GXL	4460419		SW125 (2)
2	WHT	3-15-9 SW POWER	18 AWG	GXL	4460419		SW694-1 (1)
3							
4							
5							
6							

SW125 - MAIN LIFT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	101-2 MAIN LIFT UP	18 AWG	GXL	1001159186		CO66-J4 (23)
2	WHT	3-15-1 SW POWER	18 AWG	GXL	4460419		SW533 (2)
2	WHT	3-15-3 SW POWER	18 AWG	GXL	4460419		SW124 (2)
3	WHT	102-2 MAIN LIFT DN	18 AWG	GXL	1001159186		CO66-J4 (33)
4							
5							
6							

SW569-2 - MSSO							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	119-1 MSSO	18 AWG	GXL	4460259		X500 (7)

SW569-1 - MSSO							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-31-1 INDICATOR GND	18 AWG	GXL	4460259		LB606 (2)

**Figure 7-48. Ground Panel Harness - Sheet 2 of 3**

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

GD139 - MDI							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-21 METER PWR	18 AWG	GXL	4460877		CO66-J4 (24)
2	BLK	1-32 METER GND	18 AWG	GXL	4460877		CO66-J4 (32)
3	GRN	81-3 CANT LOW	18 AWG	GXL	4460877		MS423-3 (B)
4	YEL	80-3 CANT HIGH	18 AWG	GXL	4460877		MS423-3 (A)
5							
6							
NC							

LB606 - LSS LED LT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	1-128 LSS LAMP	18 AWG	GXL	4460227		CO66-J4 (14)
2	BLK	1-31 INDICATOR GND	18 AWG	GXL	4460267		CO66-J4 (31)
2	BLK	1-31-1 INDICATOR GND	18 AWG	GXL	4460267		SW589-1 (1)

SW101-1A - EMS							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1A	RED	2-41 IGNITION	12 AWG	GXL	N/A		X500 (1)

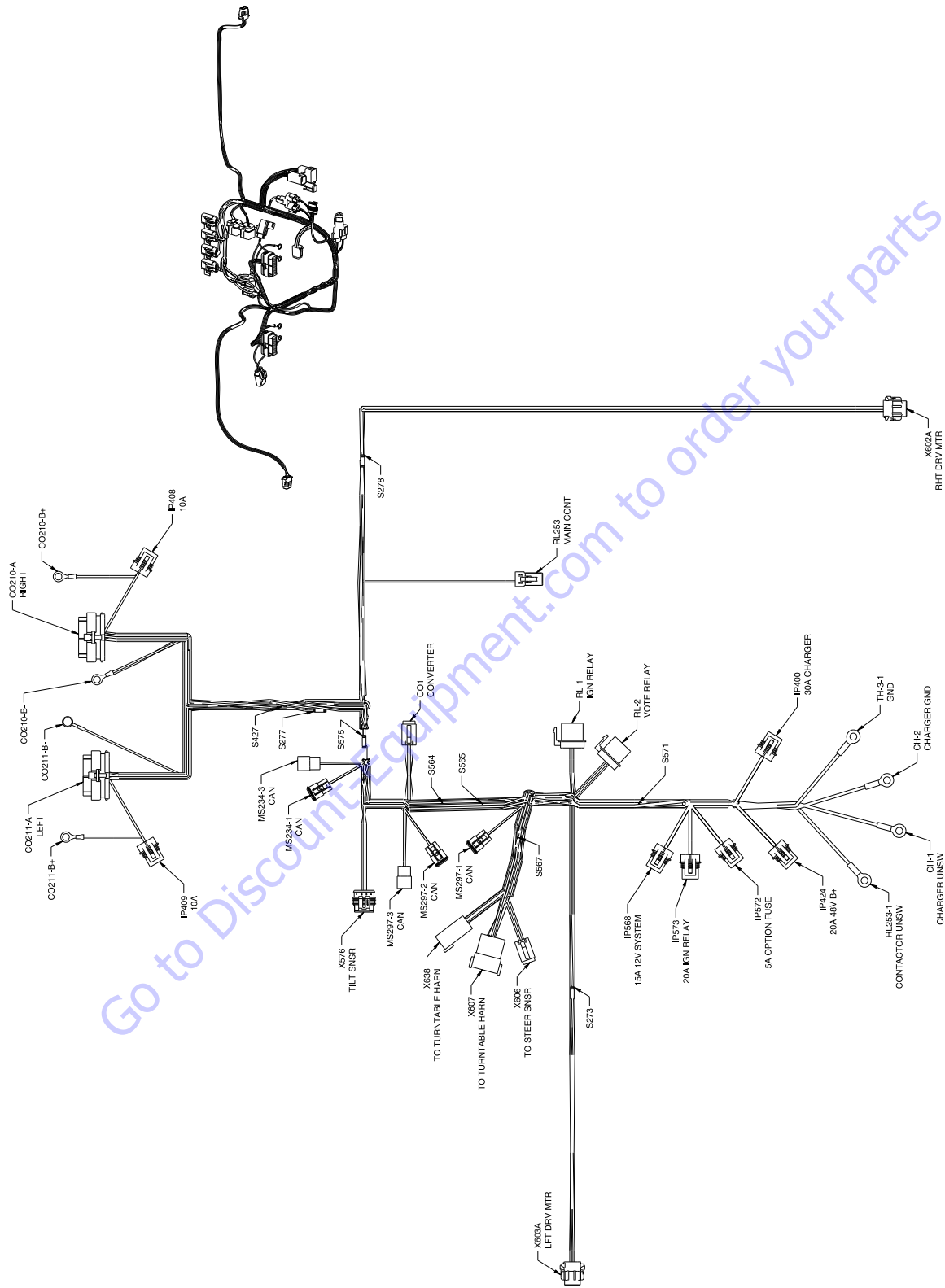
SW101-1B - EMS							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1B	RED	2-5-1 SWITCHED IGNITION	18 AWG	GXL	N/A		X500 (2)

SW101-2A - EMS							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
2A	WHT	2-5 EMS IGNITION	18 AWG	GXL	N/A		SW100-B1 (1)

SW101-2B - EMS							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
2B	WHT	2-4 EMS SW IGNITION	18 AWG	GXL	N/A		SW100-B (1)

SW604-1 - GENSET START							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-15-9 SW POWER	18 AWG	GXL	4460259		SW533 (2)

**Figure 7-49. Ground Panel Harness - Sheet 3 of 3**



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Figure 7-50. Traction Harness - Sheet 1 of 4

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

C01 - CONVERTER							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-25 CONV B+	12 AWG	GXL	1001157890		S564 (2)
2	YEL	6-2-3 IGN 48 VOLT	18 AWG	GXL	1001116692		S565 (1)
3	BLK/WHI	10-14 CONV B-	12 AWG	GXL	1001157890		TH-3-1 (1)
4	RED	2-2-1 12V UNSW	12 AWG	GXL	1001157890		IP568 (1)
5	YEL	4-2 12V SW	12 AWG	GXL	1001157890		S571 (1)
6	BLK	1-35-3 GND	12 AWG	GXL	1001157890		S567 (2)

RL-1 - IGN RELAY							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	1-0-2 B+	18 AWG	GXL	1001116732	1001116763	S564 (1)
2	WHT	5-2-2 IGN	18 AWG	GXL	1001116732		X607 (5)
3							
4	YEL	6-2 IGN 48 VOLT	18 AWG	GXL	1001116732	1001116763	S565 (2)
5	BLK	4-0-2 INSTR GND	18 AWG	GXL	1001116732		S567 (2)

RL-2 - VOTE RELAY							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	11-2-1 B+	16 AWG	GXL	1001116733	1001116763	S564 (1)
2	BLK	1-35-2 GND	18 AWG	GXL	1001116732		X607 (2)
3							
4	WHT	5-1 MAIN CONT POS	16 AWG	GXL	1001116733	1001116763	RL253 (1)
5	WHT	9 UGM MAIN VOTE	18 AWG	GXL	1001116732		X607 (3)

MS297-1 - CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
A	YEL	CAN2 HI	18 AWG	GXL	4460944		X638 (1)
B	GRN	CAN2 LOW	18 AWG	GXL	4460944		X638 (2)
C					4460466		

MS297-2 - CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
A	YEL	75-9 CAN2 HIGH	18 AWG	GXL	4460944		MS234-1 (A)
B	GRN	76-9 CAN2 LOW	18 AWG	GXL	4460944		MS234-1 (B)
C					4460466		

MS297-3 - CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
A	YEL	75-7 CAN2 HIGH	18 AWG	GXL	4460944		CO210-A (28)
B	GRN	76-7 CAN2 LOW	18 AWG	GXL	4460944		CO210-A (27)
C					4460466		

X603A - LFT DRV MTR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	56 ENC PWR	18 AWG	GXL	1001126008		CO211-A (25)
2	BRN	60 ENC B	18 AWG	GXL	1001126008		CO211-A (13)
3	YEL	59 ENC A	18 AWG	GXL	1001126008		CO211-A (14)
4	BLK	57-1 ENC GND	18 AWG	GXL	1001126008		S273 (1)
5	WHT	58 MOTOR TEMP	18 AWG	GXL	1001126008		CO211-A (22)
6	BLK	57-2 TEMP GND	18 AWG	GXL	1001126008		S273 (1)
7	ORG	94 BRAKE POS	18 AWG	GXL	1001126008		CO211-A (2)
8	BLK	95 BRAKE NEG	18 AWG	GXL	1001126008		CO211-A (4)
NC	BLK	SHLD 2 SHLD	18 AWG	GXL			CO211-B (1)

X606 - TO STEER SNSR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	50-2 STEER SN IGN	18 AWG	GXL	4460465		S277 (2)
2	BLU	52 STEER SN SIG	18 AWG	GXL	4460465		CO210-A (15)
3	BLK	51-2 STEER SN GND	18 AWG	GXL	4460465		S278 (1)
4	BLK	SHLD 5 SHLD	18 AWG	GXL	4460465		CO210-B (1)

X607 - TO TURNTABLE HARN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	2-2-2 12V UNSW	12 AWG	GXL	1001157891		IP568 (2)
2	BLK	1-35-2 GND	18 AWG	GXL	4460464		RL-2 (2)
3	WHT	9 UGM MAIN VOTE	18 AWG	GXL	4460464		RL-2 (5)
4	BLK	1-35-3 GND	12 AWG	GXL	1001157891		S567 (1)
5	WHT	5-2-2 IGN	18 AWG	GXL	4460464		RL-1 (2)
6	YEL	5-50 TILT PWR	18 AWG	GXL	4460464		X576 (1)
7	YEL	4-2-2 12V SW	12 AWG	GXL	1001157891		IP572 (2)
8	BLK	4-55 TILT GND	18 AWG	GXL	4460464		X576 (2)
9	YEL	5-10-2 IGN	12 AWG	GXL	1001157891		IP573 (2)
10	BLK	4-0-3 INST GND	14 AWG	GXL	1001157891		S567 (1)
11	YEL	CAN 1 HI	18 AWG	GXL	4460943		X576 (3)
12	GRN	CAN 1 LO	18 AWG	GXL	4460943		X576 (4)

X576 - TILT SNSR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	5-50 TILT PWR	18 AWG	GXL	1001107854	1001104498	X607 (6)
2	BLK	4-55 TILT GND	18 AWG	GXL	1001107854	1001104498	X607 (8)
3	YEL	CAN 1 HI	18 AWG	GXL	1001107854	1001104498	X607 (11)
4	GRN	CAN 1 LO	18 AWG	GXL	1001107854	1001104498	X607 (12)

X638 - TO TURNTABLE HARN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	CAN2 HI	18 AWG	GXL	4460943		MS297-1 (A)
2	GRN	CAN2 LOW	18 AWG	GXL	4460943		MS297-1 (B)
3	BLK	46 B-	12 AWG	GXL	1001157891		CH-2 (1)
4	WHT	45-3-2 CHARGING STAT	18 AWG	GXL	4460464		CO210-A (16)
5	RED	45-3-2 B+	12 AWG	GXL	1001157891		IP400 (2)
6	YEL	6-2-1 IGN 48 VOLT	18 AWG	GXL	4460464		S565 (2)

IP400 - 30A CHARGER							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	45-3 B+	12 AWG	GXL	1001116734		CH-1 (1)
2	RED	45-3-2 B+	12 AWG	GXL	1001116734		X638 (5)

IP424 - 20A 48V B+							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-2-2 B+	12 AWG	GXL	1001116734		RL253-1 (1)
2	RED	1-0 B+	12 AWG	GXL	1001116734		S564 (1)

IP568 - 15A 12V SYSTEM							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	2-2-1 12V UNSW	12 AWG	GXL	1001116734		CO1 (4)
2	RED	2-2-2 12V UNSW	12 AWG	GXL	1001116734		X607 (1)

IP572 - 5A OPTION FUSE							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	4-2 12V SW	12 AWG	GXL	1001116734		S571 (2)
2	YEL	4-2-2 12V SW	12 AWG	GXL	1001116734		X607 (7)

IP573 - 20A IGN RELAY							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	4-2-4 12V SW	12 AWG	GXL	1001116733		S571 (2)
2	YEL	5-10-2 IGN	12 AWG	GXL	1001116734		X607 (9)

Figure 7-51. Traction Harness - Sheet 2 of 4



## SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

CH-1 - CHARGER UNSW							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	45-3 B+	12 AWG	GXL	N/A		IP400 (1)

CH-2 - CHARGER GND							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	46 B-	12 AWG	GXL			X638 (3)

RL253-1 - CONTACTOR UNSW							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-2-2 B+	12 AWG	GXL	N/A		IP424 (1)

TH-3-1 - GND							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK/WHT	10-14 CONV B-	12 AWG	GXL	N/A		CO1 (3)

S273							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	57-1 ENC GND	18 AWG	GXL	N/A		X603A (4)
1	BLK	57-2 TEMP GND	18 AWG	GXL	N/A		X603A (6)
2	BLK	57 ENC GND	18 AWG	GXL	N/A		CO211-A (5)

S564							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	1-0 B+	12 AWG	GXL	N/A		IP424 (2)
1	RED	1-0-2 B+	18 AWG	GXL	N/A		RL-1 (1)
1	YEL	11-2-1 B+	16 AWG	GXL	N/A		RL-2 (1)
2	RED	11-2-5 COMW B+	12 AWG	GXL	N/A		CO1 (1)

S565							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	4-1 ZAPIGN	16 AWG	GXL	N/A		S575 (1)
1	YEL	6-2-3 IGN 48 VOLT	18 AWG	GXL	N/A		CO1 (2)
2	YEL	6-2 IGN 48 VOLT	18 AWG	GXL	N/A		RL-1 (4)
2	YEL	6-2-1 IGN 48 VOLT	18 AWG	GXL	N/A		X638 (6)

S567							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-35-3 GND	12 AWG	GXL	N/A		X607 (4)
1	BLK	4-0-3 INST GND	14 AWG	GXL	N/A		X607 (10)
2	BLK	1-35-3 GND	12 AWG	GXL	N/A		CO1 (6)
2	BLK	4-0-2 INSTR GND	18 AWG	GXL	N/A		RL-1 (5)

S571							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	YEL	4-2 12V SW	12 AWG	GXL	N/A		CO1 (5)
2	YEL	4-2 12V SW	12 AWG	GXL	N/A		IP572 (1)
2	YEL	4-2-4 12V SW	12 AWG	GXL	N/A		IP573 (1)

CO210-A - RIGHT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1						4460905	
2	ORG	92 BRAKE POS	18 AWG	GXL			X602A (7)
3	RED	11-17-1 +VALVES	16 AWG	GXL			IP408 (1)
4	BLK	93 BRAKE NEG	18 AWG	GXL			X602A (8)
5	BLK	51 ENC GND	18 AWG	GXL			S278 (1)
6	BLK	10-9 ADDRESSING	18 AWG	GXL			CO210-B- (1)
7						4460905	
8						4460905	
9						4460905	
10	WHT	4-3 ZAPIGN	16 AWG	GXL			S575 (2)
11						4460905	
12	WHT	6 MAIN CONT NEG	18 AWG	GXL			RL253 (2)
13	BRN	55 ENC B	18 AWG	GXL			X602A (2)
14	BLU	54 ENC A	18 AWG	GXL			X602A (3)
15	YEL	52 STEER SN SKG	18 AWG	GXL			X606 (2)
16	WHT	45-3-2 CHARGING STAT	18 AWG	GXL			X638 (4)
17						4460905	
18						4460905	
19						4460905	
20						4460905	
21						4460905	
22	WHT	53 MOTOR TEMP	18 AWG	GXL			X602A (5)
23						4460905	
24						4460905	
25	RED	50 ENC PWR	18 AWG	GXL			S277 (1)
26						4460905	
27	GRN	76-7 CAN2 LOW	18 AWG	GXL			MS297-3 (B)
28	YEL	75-7 CAN2 HIGH	18 AWG	GXL			MS297-3 (A)
29						4460905	
30						4460905	
31						4460905	
32						4460905	
33						4460905	
34						4460905	
35						4460905	
NC						N/A	

CO210-B+							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-17	16 AWG	GXL	N/A		IP408 (2)

CO210-B-							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	10-9 ADDRESSING	18 AWG	GXL	N/A		CO210-A (6)
1	BLK	SHLD 1 SHLD	18 AWG	GXL	N/A		X602A (NC)
1	BLK	SHLD 5 SHLD	18 AWG	GXL	N/A		X606 (4)

MS234-1 - CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
A	YEL	75-9 CAN2 HIGH	18 AWG	GXL	4460944		MS297-2 (A)
B	GRN	76-9 CAN2 LOW	18 AWG	GXL	4460944		MS297-2 (B)
C					4460466		

MS234-3 - CAN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
A	YEL	75-10 CAN2 HIGH	18 AWG	GXL	4460944		CO211-A (28)
B	GRN	76-10 CAN2 LOW	18 AWG	GXL	4460944		CO211-A (27)
C					4460466		

RL253 - MAIN CONT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	5-1 MAIN CONT POS	16 AWG	GXL	1001126008		RL-2 (4)
2	WHT	6 MAIN CONT NEG	18 AWG	GXL	1001126008		CO210-A (12)

IP408 - 10A							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-17-1 +VALVES	16 AWG	GXL	1001116733		CO210-A (3)
2	RED	11-17	16 AWG	GXL	1001116733		CO210-B+ (1)

Figure 7-52. Traction Harness - Sheet 3 of 4

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

S277							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	50 ENC PWR	18 AWG	GXL	N/A		CO210-A (25)
2	RED	50-1 ENC PWR	18 AWG	GXL	N/A		X602A (1)
2	RED	50-2 STEER SN IGN	18 AWG	GXL	N/A		X606 (1)

CO211-A - LEFT							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1					4460905		
2	ORG	94 BRAKE POS	18 AWG	GXL	4460871		X803A (7)
3	RED	11-18-1	16 AWG	GXL	4460871		IP409 (1)
4	BLK	95 BRAKE NEG	18 AWG	GXL	4460871		X803A (8)
5	BLK	57 ENC GND	18 AWG	GXL	4460871		S273 (2)
6	WHT	4-2-3 ADDR 1	18 AWG	GXL	4460871		S427 (2)
7					4460905		
8					4460905		
9					4460905		
10	WHT	4-2-1 ZAPIGN	16 AWG	GXL	4460871		S427 (2)
11					4460905		
12					4460905		
13	BRN	60 ENC B	18 AWG	GXL	4460871		X803A (2)
14	YEL	59 ENC A	18 AWG	GXL	4460871		X803A (3)
15					4460905		
16					4460905		
17					4460905		
18					4460905		
19					4460905		
20					4460905		
21					4460905		
22	WHT	58 MOTOR TEMP	18 AWG	GXL	4460871		X803A (5)
23					4460905		
24					4460905		
25	RED	56 ENC PWR	18 AWG	GXL	4460871		X803A (1)
26					4460905		
27	GRN	76-10 CAN2 LOW	18 AWG	GXL	4460871		MS234-3 (B)
28	YEL	75-10 CAN2 HIGH	18 AWG	GXL	4460871		MS234-3 (A)
29					4460905		
30					4460905		
31					4460905		
32					4460905		
33					4460905		
34					4460905		
35					4460905		
NC					N/A		

CO211-B+							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-18	16 AWG	GXL	N/A		IP409 (2)

CO211-B-							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	SHLD2 SHLD	18 AWG	GXL	N/A		X803A (NC)

X602A - RHT DRV MTR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	50-1 ENC PWR	18 AWG	GXL	1001126008		S277 (2)
2	BRN	55 ENC B	18 AWG	GXL	1001126008		CO210-A (13)
3	YEL	54 ENC A	18 AWG	GXL	1001126008		CO210-A (14)
4	BLK	51-1 ENC GND	18 AWG	GXL	1001126008		S278 (2)
5	WHT	53 MOTOR TEMP	18 AWG	GXL	1001126008		CO210-A (22)
6	BLK	51-3 TEMP GND	18 AWG	GXL	1001126008		S278 (2)
7	ORG	92 BRAKE POS	18 AWG	GXL	1001126008		CO210-A (2)
8	BLK	93 BRAKE NEG	18 AWG	GXL	1001126008		CO210-A (4)
NC	BLK	SHLD1 SHLD	18 AWG	GXL			CO210-B (1)

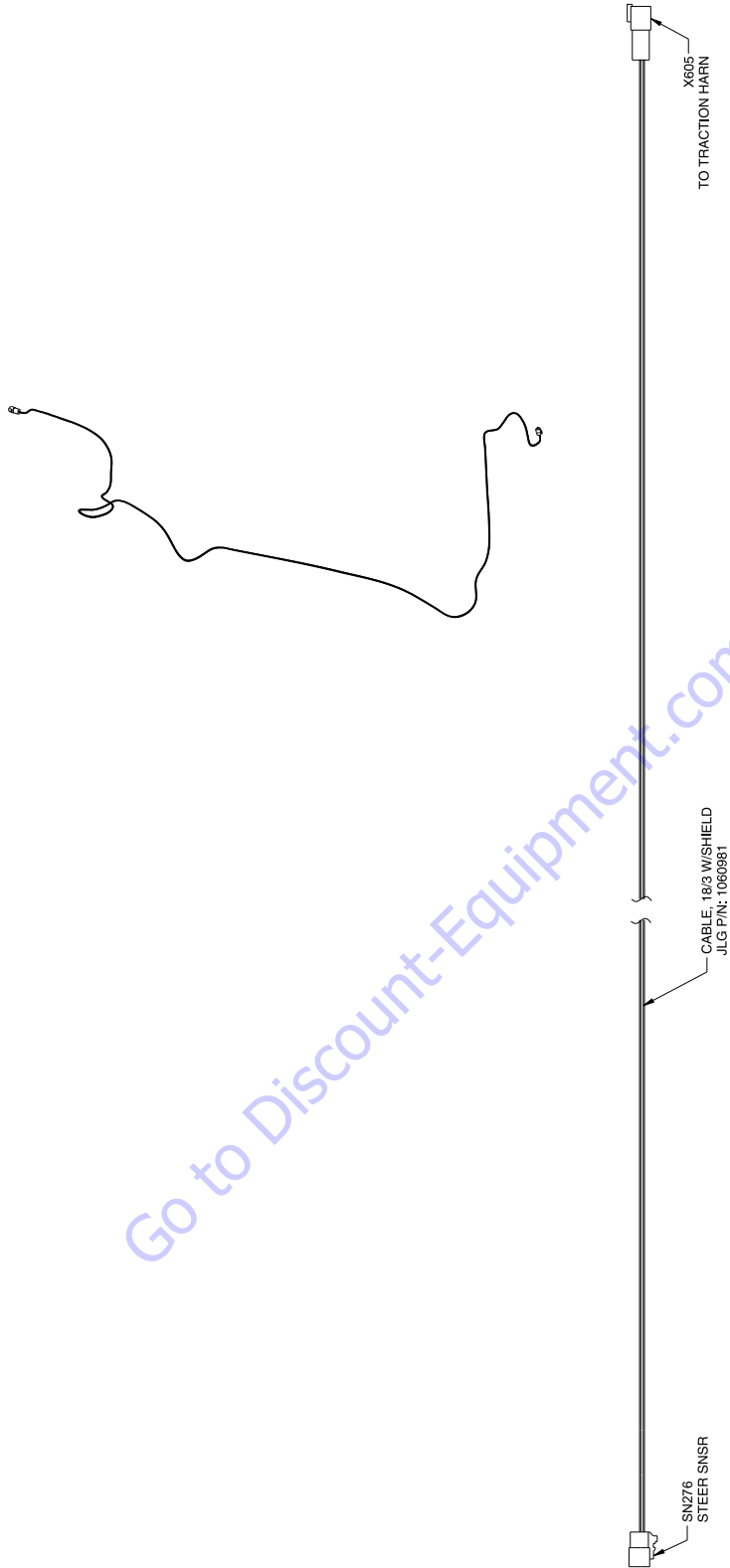
IP409 - 10A							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	RED	11-18-1	16 AWG	GXL	1001116733		CO211-A (3)
2	RED	11-18	16 AWG	GXL	1001116733		CO211-B+ (1)

S278							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	51 ENC GND	18 AWG	GXL	N/A		CO210-A (5)
1	BLK	51-2 STEER SN GND	18 AWG	GXL	N/A		X606 (3)
2	BLK	51-1 ENC GND	18 AWG	GXL	N/A		X602A (4)
2	BLK	51-3 TEMP GND	18 AWG	GXL	N/A		X602A (6)

S427							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	4-4 ZAPIGN	16 AWG	GXL	N/A		S575 (1)
2	WHT	4-2-1 ZAPIGN	16 AWG	GXL	N/A		CO211-A (10)
2	WHT	4-2-3 ADDR 1	18 AWG	GXL	N/A		CO211-A (6)

S575							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	4-1 ZAPIGN	16 AWG	GXL	N/A		S565 (1)
1	WHT	4-4 ZAPIGN	16 AWG	GXL	N/A		S427 (1)
2	WHT	4-3 ZAPIGN	16 AWG	GXL	N/A		CO210-A (10)

Figure 7-53. Traction Harness - Sheet 4 of 4



**X605 - TO TRACTION HARN**

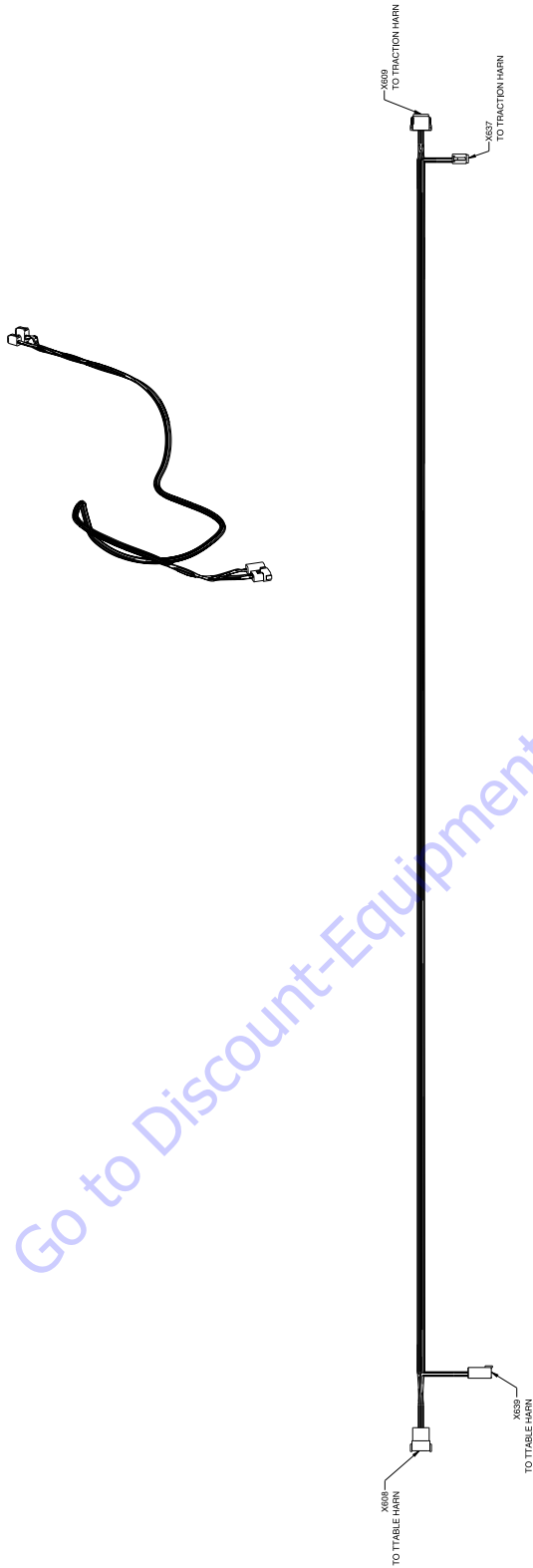
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	#/SET	TERMINAL P/N	SEAL P/N	TO
1	RED		18 AWG	CABLE	4460944		SN276 (1)
2	BLU		18 AWG	CABLE	4460944		SN276 (2)
3	BLK		18 AWG	CABLE	4460944		SN276 (3)
4	SHLD		18 AWG	CABLE	4460944		SN276 (NC)

**SN276 - STEER SNRSR**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	#/SET	TERMINAL P/N	SEAL P/N	TO
1	RED		18 AWG	CABLE	4460944		X605 (1)
2	BLU		18 AWG	CABLE	4460944		X605 (2)
3	BLK		18 AWG	CABLE	4460944		X605 (3)
NC	SHLD		18 AWG	CABLE	N/A		X605 (4)

1001195835 B

Figure 7-54. Steering SNRSR Harness



**X609 - TO TRACTION HARN**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN	TO
1	RED	2-22 12V LNSW	12 AWG	GXL	1001157890		X609 (1)
2	BLK	1-35-4 GND	18 AWG	GXL	4460465		X609 (2)
3	WHT	9-1 UGM MAN VOTE	18 AWG	GXL	4460465		X609 (3)
4	BLK	1-35-5 GND	12 AWG	GXL	1001157890		X609 (4)
5	WHT	5-5-3 IGN	18 AWG	GXL	4460465		X609 (5)
6	YEL	5-5-2 TILT PWR	18 AWG	GXL	4460465		X609 (6)
7	YEL	4-2-2 12V SW	12 AWG	GXL	1001157890		X609 (7)
8	BLK	4-5-2 TILT GND	18 AWG	GXL	4460465		X609 (8)
9	YEL	5-1-4 IGN	12 AWG	GXL	1001157890		X609 (9)
10	BLK	5-1-3 INST GND	14 AWG	GXL	1001157890		X609 (10)
11	YEL	CANI HI	18 AWG	GXL	4460944		X609 (11)
12	GRN	CANI LOW	18 AWG	GXL	4460944		X609 (12)

**X608 - TO TTABLE HARN**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN	TO
1	RED	2-22 12V LNSW	12 AWG	GXL	1001157891		X608 (1)
2	BLK	1-35-4 GND	18 AWG	GXL	4460464		X608 (2)
3	WHT	9-1 UGM MAN VOTE	18 AWG	GXL	4460464		X608 (3)
4	BLK	1-35-5 GND	12 AWG	GXL	1001157891		X608 (4)
5	WHT	5-5-3 IGN	18 AWG	GXL	4460464		X608 (5)
6	YEL	5-5-2 TILT PWR	18 AWG	GXL	4460464		X608 (6)
7	YEL	4-2-2 12V SW	12 AWG	GXL	1001157891		X608 (7)
8	BLK	4-5-2 TILT GND	18 AWG	GXL	4460464		X608 (8)
9	YEL	5-1-4 IGN	12 AWG	GXL	1001157891		X608 (9)
10	BLK	5-1-3 INST GND	14 AWG	GXL	1001157891		X608 (10)
11	YEL	CANI HI	18 AWG	GXL	4460943		X608 (11)
12	GRN	CANI LOW	18 AWG	GXL	4460943		X608 (12)

**X637 - TO TRACTION HARN**

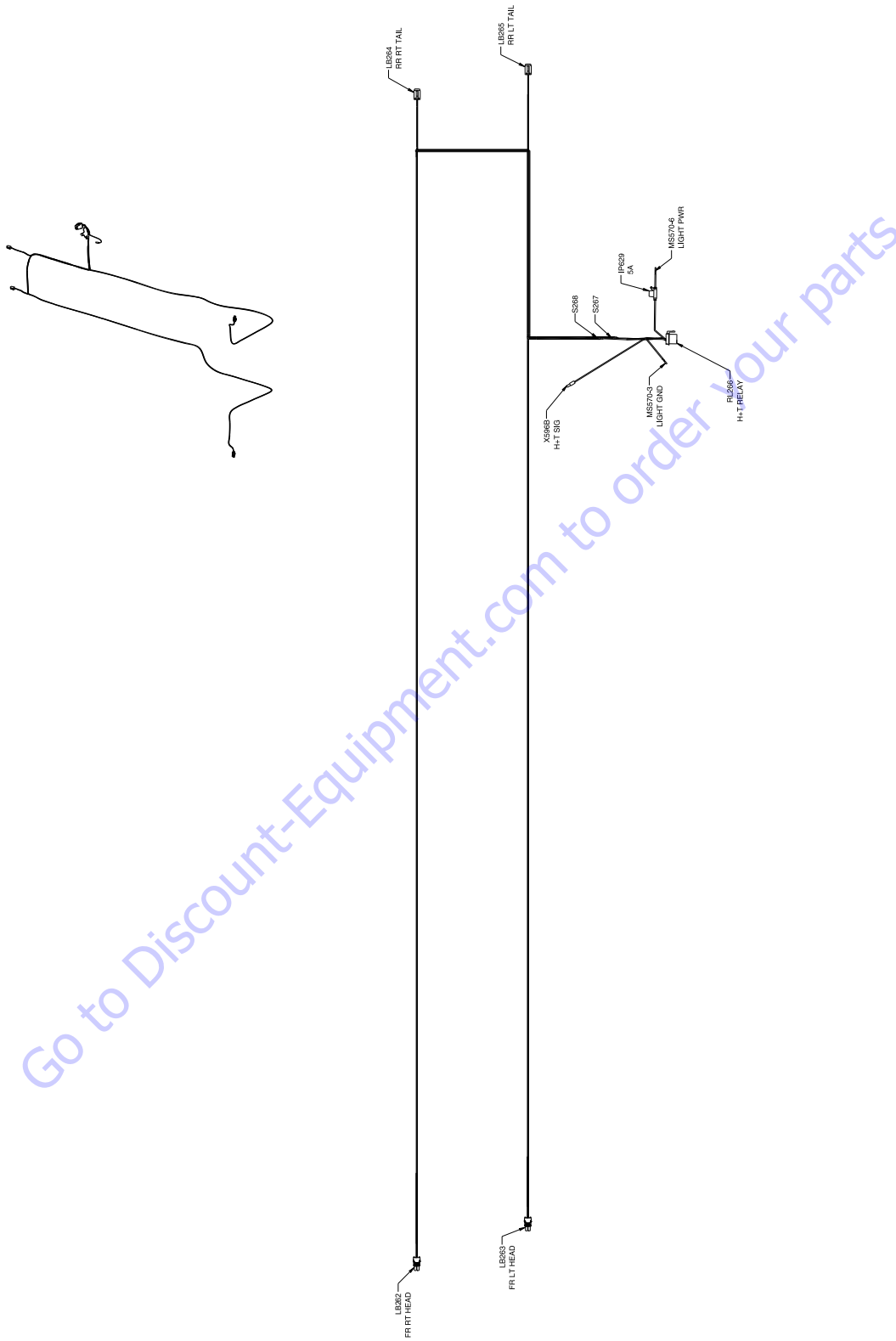
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN	TO
1	YEL	CAN2 HI	18 AWG	GXL	4460944		X637 (1)
2	GRN	CAN2 LOW	18 AWG	GXL	4460944		X637 (2)
3	BLK	46-1 B-	12 AWG	GXL	1001157890		X637 (3)
4	WHT	45-3-4 CHARGING STAT	18 AWG	GXL	4460465		X637 (4)
5	RED	45-3-5 B+	12 AWG	GXL	1001157890		X637 (5)
6	YEL	6-2-4 IGN 48V	18 AWG	GXL	4460465		X637 (6)

**X639 - TO TTABLE HARN**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL PIN	SEAL PIN	TO
1	YEL	CAN2 HI	18 AWG	GXL	4460943		X639 (1)
2	GRN	CAN2 LOW	18 AWG	GXL	4460943		X639 (2)
3	BLK	46-1 B-	12 AWG	GXL	1001157891		X639 (3)
4	WHT	45-3-4 CHARGING STAT	18 AWG	GXL	4460464		X639 (4)
5	RED	45-3-5 B+	12 AWG	GXL	1001157891		X639 (5)
6	YEL	6-2-4 IGN 48V	18 AWG	GXL	4460464		X639 (6)

Figure 7-55. Traction to Turntable Harness

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Figure 7-56. Chassis Head/Tail Light Harness - Sheet 1 of 2

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

LB262 - FR RT HEAD							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-22-1 GND	16 AWG	GXL	4460457	4460458	S268 (2)
2	WHT	3-12-1 LIGHT	16 AWG	GXL	4460457	4460458	S267 (2)

LB263 - FR LT HEAD							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-22-5 GND	16 AWG	GXL	4460457	4460458	S268 (2)
2	WHT	3-12-2 LIGHT	16 AWG	GXL	4460457	4460458	S267 (2)

S268							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-22 LIGHT GND	14 AWG	GXL	N/A		MS570-3 (1)
1	BLK	1-22-5 GND	18 AWG	GXL	N/A		RL266 (2)
2	BLK	1-22-1 GND	16 AWG	GXL	N/A		LB262 (1)
2	BLK	1-22-2 GND	16 AWG	GXL	N/A		LB263 (1)
2	BLK	1-22-3 GND	16 AWG	GXL	N/A		LB264 (1)
2	BLK	1-22-4 GND	16 AWG	GXL	N/A		LB265 (1)

LB264 - RR RT TAIL							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-22-3 GND	16 AWG	GXL	4460465		S268 (2)
2	WHT	3-12-3 LIGHT	16 AWG	GXL	4460465		S267 (2)
3					4460466		
4					4460466		

LB265 - RR LT TAIL							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-22-4 GND	16 AWG	GXL	4460465		S268 (2)
2	WHT	3-12-4 LIGHT	16 AWG	GXL	4460465		S267 (2)
3					4460466		
4					4460466		

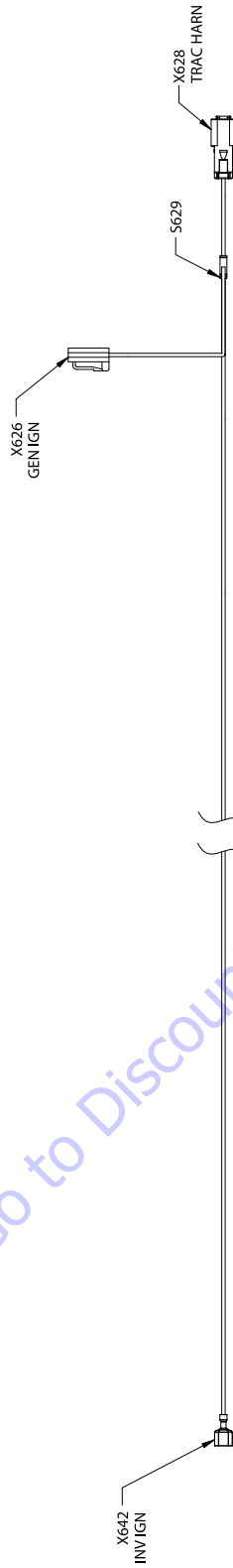
S267							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-12 LIGHT PWR	14 AWG	GXL	N/A		RL266 (4)
2	WHT	3-12-1 LIGHT	16 AWG	GXL	N/A		LB262 (2)
2	WHT	3-12-2 LIGHT	16 AWG	GXL	N/A		LB263 (2)
2	WHT	3-12-3 LIGHT	16 AWG	GXL	N/A		LB264 (2)
2	WHT	3-12-4 LIGHT	16 AWG	GXL	N/A		LB265 (2)

MS570-3 - LIGHT GND							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	1-22 LIGHT GND	14 AWG	GXL			S268 (1)

RL266 - H+T RELAY							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK		14 AWG	GXL	100116733		IP629 (2)
2	BLK	1-22-5 GND	18 AWG	GXL	100116732		S268 (1)
3							
4	WHT	3-12 LIGHT PWR	14 AWG	GXL	100116733		S267 (1)
5	WHT	88-2 LIGHTING	16 AWG	GXL	100116732		X596B (1)

X596B - H+T SIG							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	88-2 LIGHTING	16 AWG	GXL			RL266 (5)

**Figure 7-57. Chassis Head/Tail Light Harness - Sheet 2 of 2**



X642 - INV IGN						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	IGN-48V	18 AWG	GXL	1001193545	S629 (2)

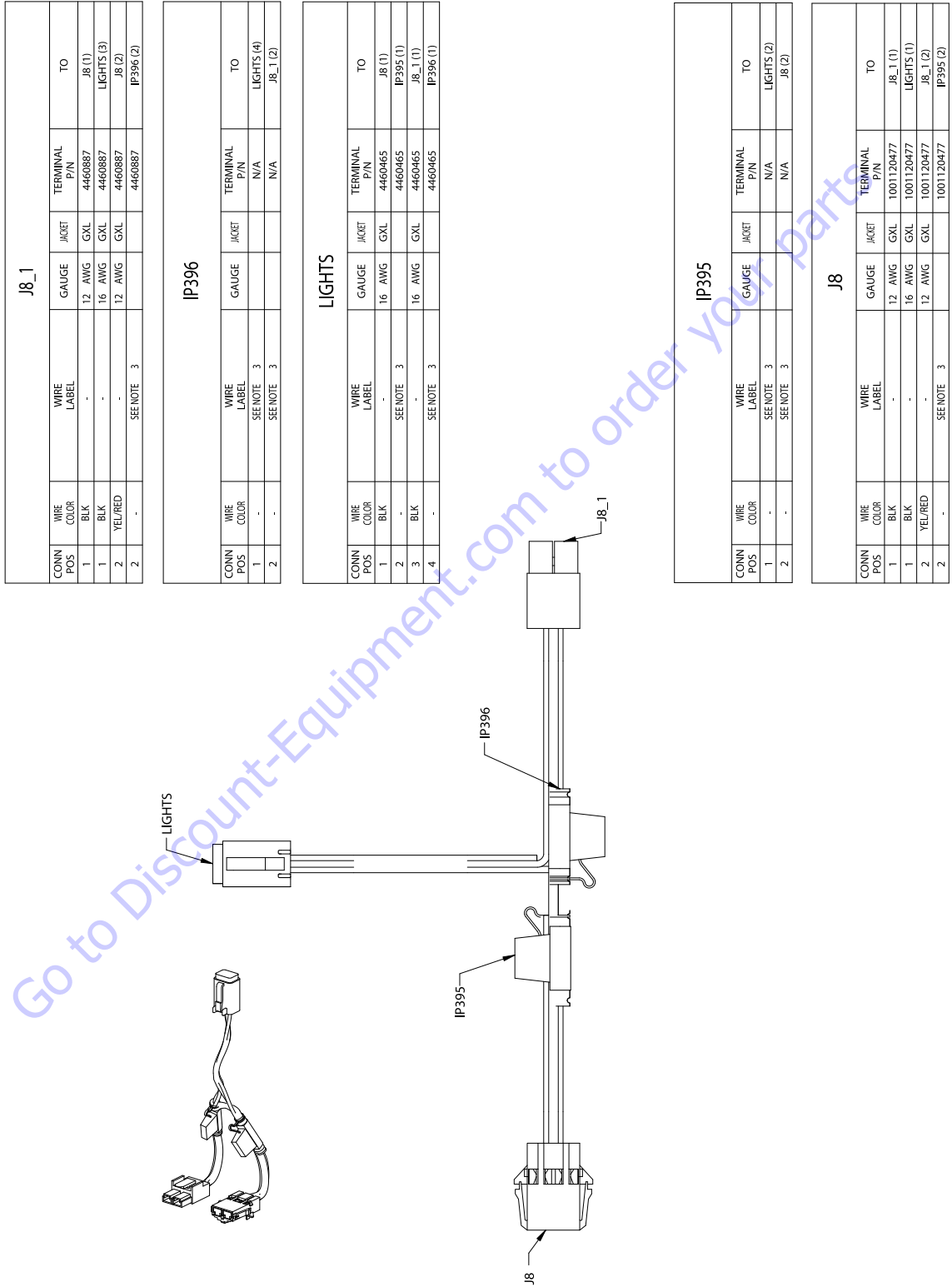
X628 - TRAC HARN						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	8-8-1	18 AWG	GXL	4460464	S629 (1)
2					4460466	

X626 - GEN IGN						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	8-8-3	18 AWG	GXL	4460465	S629 (2)
2					4460466	

S629						
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	TO
1	WHT	8-8-1	18 AWG	GXL	N/A	X628 (1)
2	WHT	IGN-48V	18 AWG	GXL	N/A	X642 (1)
2	WHT	8-8-3	18 AWG	GXL	N/A	X626 (1)

Figure 7-58. Inverter Ign Harness

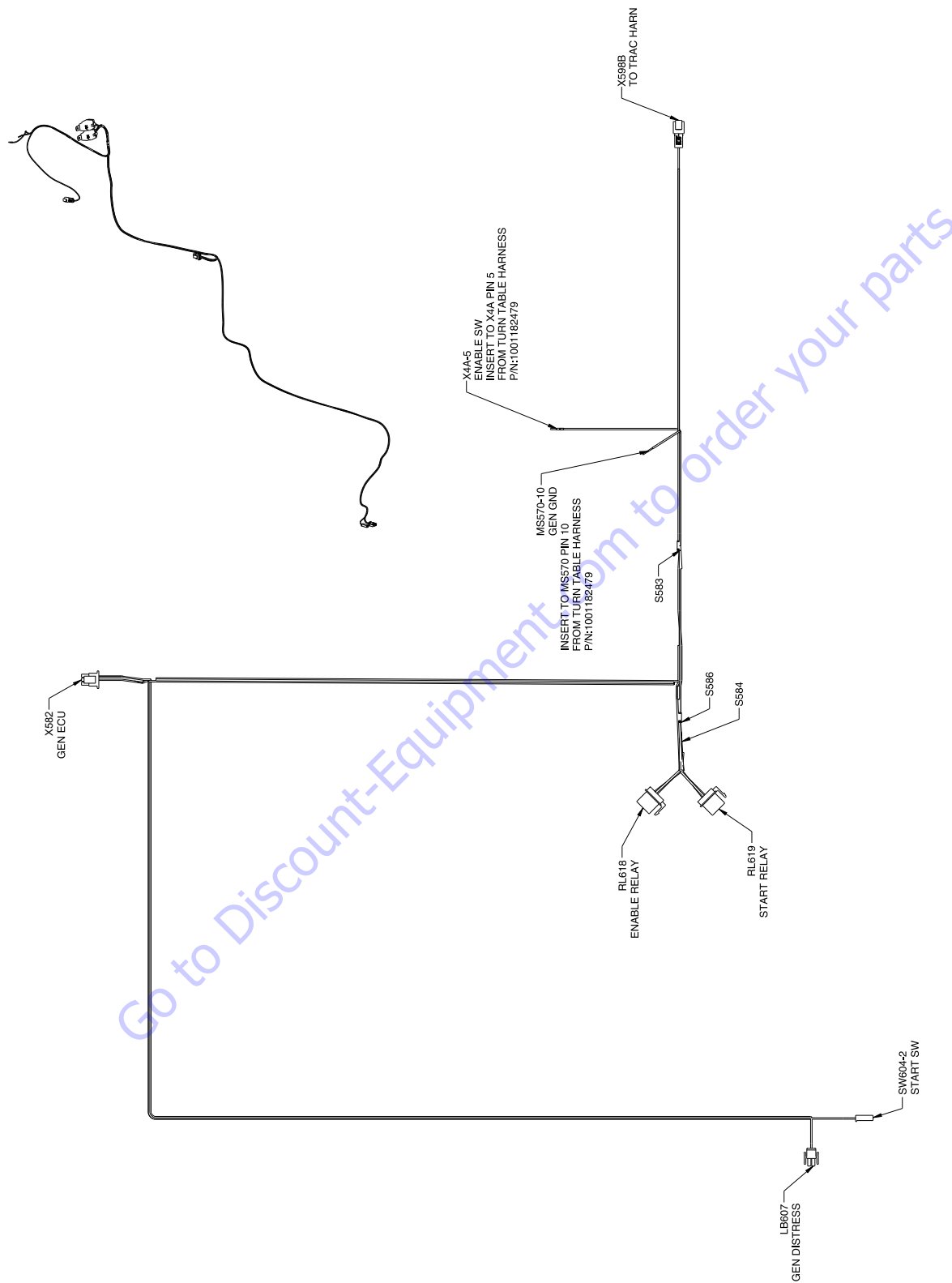
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Figure 7-59. Platform Work Light Harness





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Figure 7-60. Generator Ign Harness - Sheet 1 of 2

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

MS570-10 - GEN GND							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	8-1 GND	18 AWG	GXL	N/A		S586 (1)

X4A-5 - ENABLE SW							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-3 GENSET ENABLE SW	18 AWG	GXL	N/A		RL618 (5)

X582 - GEN ECU							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-6	14 AWG	GXL	4460267		RL618 (4)
2	WHT	8-7	14 AWG	GXL	4460267		RL619 (4)
3	WHT	8-8 GEN DISTRESS POWER	18 AWG	GXL	4460267		LB607 (2)
4	WHT	8-5 GEN DISTRESS GND	18 AWG	GXL	4460267		LB607 (1)
5	WHT	8-4-2 IGN 48VOLT	18 AWG	GXL	4460267		S583 (2)
6							

X598B - TO TRAC HARN							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-4-1 IGN 48VOLT	18 AWG	GXL	4460464		S583 (1)
2					4460466		

LB607 - GEN DISTRESS							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-5 GEN DISTRESS GND	18 AWG	GXL	4460227		X582 (4)
2	WHT	8-4 GEN DISTRESS POWER	18 AWG	GXL	4460227		X582 (3)

RL618 - ENABLE RELAY							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-4-4 IGN 48VOLT	14 AWG	GXL	1001116733		S584 (2)
2	BLK	8-1-2 GND	18 AWG	GXL	1001116732		S586 (2)
3							
4	WHT	8-6	14 AWG	GXL	1001116733		X582 (1)
5	WHT	8-3 GENSET ENABLE SW	18 AWG	GXL	1001116732		X4A-5 (1)

RL619 - START RELAY							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-4-5 IGN 48VOLT	14 AWG	GXL	1001116733		S584 (2)
2	BLK	8-1-3 GND	18 AWG	GXL	1001116732		S586 (2)
3							
4	WHT	8-7	14 AWG	GXL	1001116733		X582 (2)
5	WHT	8-2 GENSET START SW	18 AWG	GXL	1001116732		SW604-2 (1)

SW604-2 - START SW							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-2 GENSET START SW	18 AWG	GXL	4460259		RL619 (5)

S583							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-4-1 IGN 48VOLT	18 AWG	GXL	N/A		X598B (1)
2	WHT	8-4-2 IGN 48VOLT	18 AWG	GXL	N/A		X582 (5)
2	WHT	8-4-3 IGN 48VOLT	18 AWG	GXL	N/A		S584 (1)

S584							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	8-4-3 IGN 48VOLT	18 AWG	GXL	N/A		S583 (2)
2	WHT	8-4-4 IGN 48VOLT	14 AWG	GXL	N/A		RL618 (1)
2	WHT	8-4-5 IGN 48VOLT	14 AWG	GXL	N/A		RL619 (1)

S586							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	BLK	8-1 GND	18 AWG	GXL	N/A		MS570-10 (1)
2	BLK	8-1-2 GND	18 AWG	GXL	N/A		RL618 (2)
2	BLK	8-1-3 GND	18 AWG	GXL	N/A		RL619 (2)

Figure 7-61. Generator Ign Harness - Sheet 2 of 2

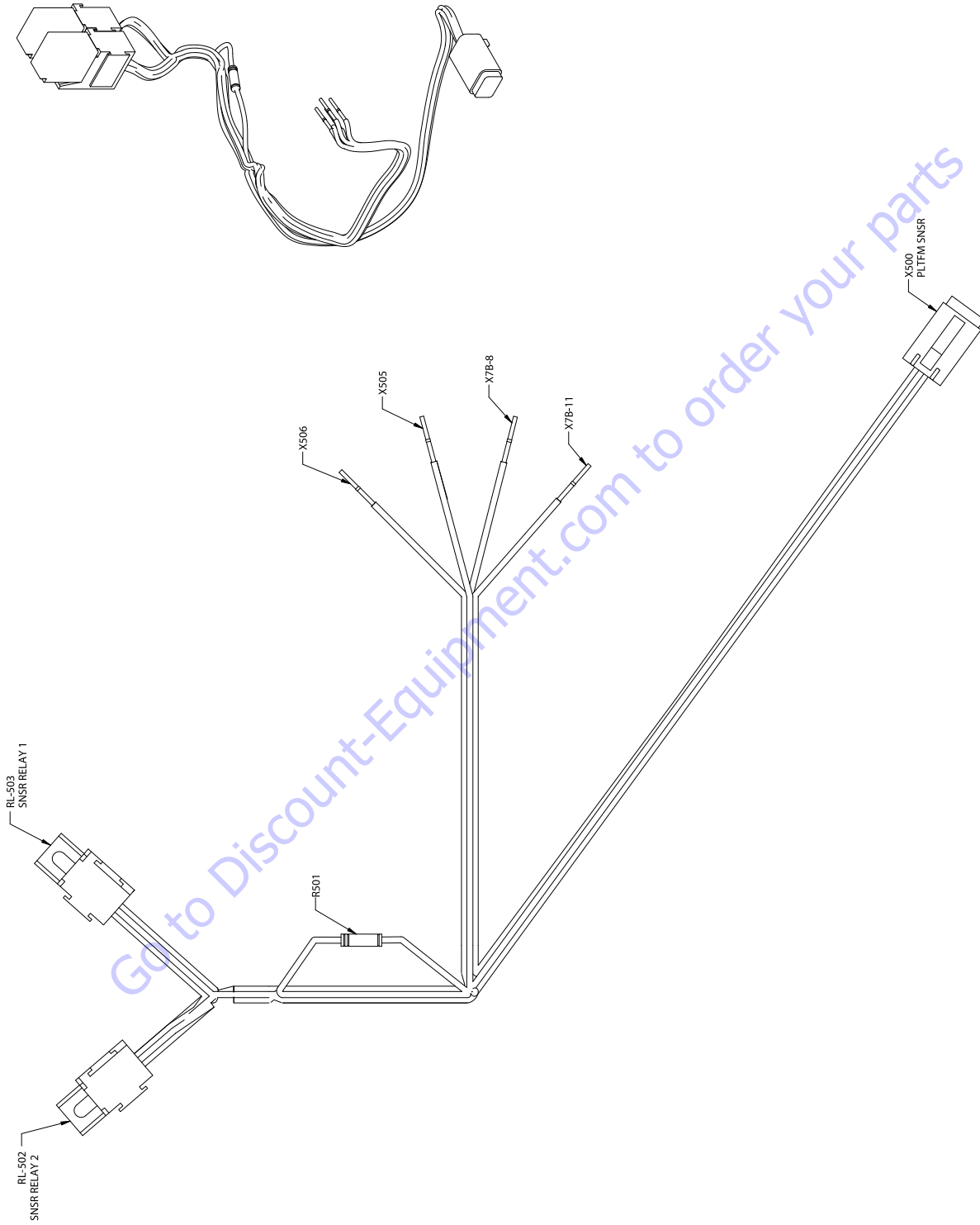


Figure 7-62. SkyGuard Harness - Sheet 1 of 2

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

X506							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P1	18 AWG	GXL			RL-503 (87)

X505							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P2	18 AWG	GXL			R501 (1)
1	WHT	P9	18 AWG	GXL			RL-503 (30)

X7B-8							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P6	18 AWG	GXL			X500 (2)

X7B-11							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P3	18 AWG	GXL			RL-502 (87)

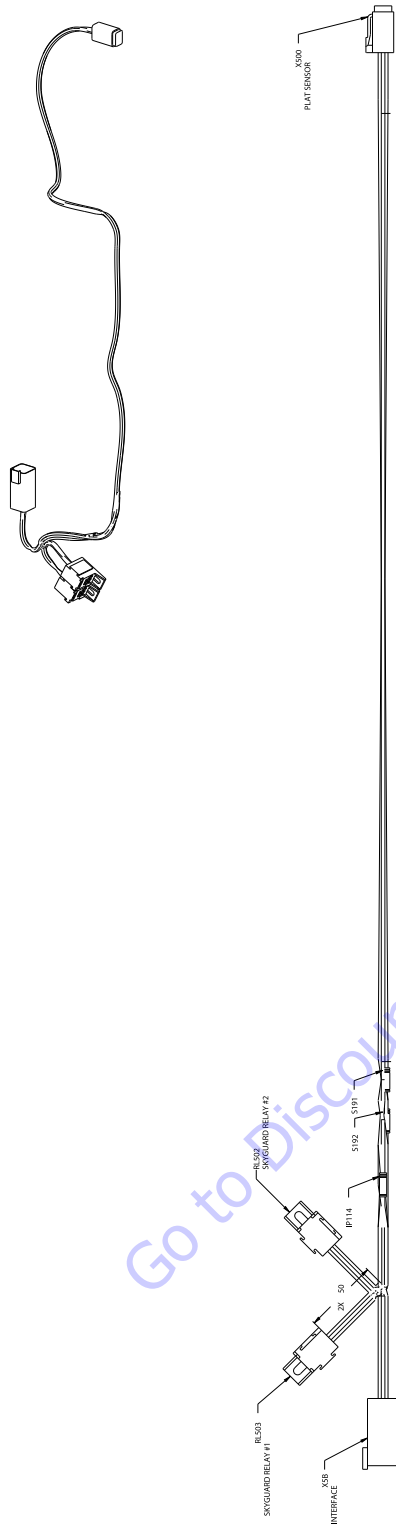
X500 - PLTFM SNSR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P10	18 AWG	GXL	4460465		R501 (2)
2	WHT	P6	18 AWG	GXL	4460465		X7B-8 (1)
3	WHT	P4	18 AWG	GXL	4460465		RL-502 (86)
4	WHT	P5	18 AWG	GXL	4460465		RL-502 (85)

RL-502 - SNSR RELAY 2							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
30	WHT	P9-1	18 AWG	GXL	1001116720		RL-503 (30)
85	WHT	P5	18 AWG	GXL	1001116720		X500 (4)
85	WHT	P5-1	18 AWG	GXL	1001116720		RL-503 (85)
86	WHT	P4	18 AWG	GXL	1001116720		X500 (3)
86	WHT	P4-1	18 AWG	GXL	1001116720		RL-503 (86)
87	WHT	P3	18 AWG	GXL	1001116720		X7B-11 (1)
87a							

RL-503 - SNSR RELAY 1							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
30	WHT	P9	18 AWG	GXL	1001116720		X505 (1)
30	WHT	P9-1	18 AWG	GXL	1001116720		RL-502 (30)
85	WHT	P5-1	18 AWG	GXL	1001116720		RL-502 (85)
86	WHT	P4-1	18 AWG	GXL	1001116720		RL-502 (86)
87	WHT	P1	18 AWG	GXL	1001116720		X506 (1)
87a							

R501							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P2	18 AWG	GXL	N/A		X505 (1)
2	WHT	P10	18 AWG	GXL	N/A		X500 (1)

**Figure 7-63. SkyGuard Harness - Sheet 2 of 2**



**X500 - PLAT SENSOR**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P10	18 AWG	GXL	4462465		IP114 (2)
2	WHT	P6	18 AWG	GXL	4462465		X58 (2)
3	WHT	P4	18 AWG	GXL	4462465		S192 (2)
4	WHT	P3	18 AWG	GXL	4462465		S191 (2)

**IP114**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P2	18 AWG	GXL	N/A		X58 (1)
1	WHT	PF-1	18 AWG	GXL	N/A		RL503 (30)
2	WHT	PF-2	18 AWG	GXL	N/A		RL502 (30)
2	WHT	P10	18 AWG	GXL	N/A		X500 (1)

**X58 - INTERFACE**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P2	18 AWG	GXL	4462464		IP114 (1)
2	WHT	P6	18 AWG	GXL	4462464		X502 (2)
3	WHT	P6	18 AWG	GXL	4462466		RL503 (87)
4	WHT	F1	18 AWG	GXL	4462464		RL502 (87)
5	WHT	F3	18 AWG	GXL	4462464		RL503 (87)
6	WHT				4462466		

**S192**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	PA-1	18 AWG	GXL	N/A		RL503 (86)
2	WHT	PA-2	18 AWG	GXL	N/A		RL502 (86)
2	WHT	P4	18 AWG	GXL	N/A		X500 (2)

**S191**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	PF-1	18 AWG	GXL	N/A		RL503 (85)
2	WHT	PF-2	18 AWG	GXL	N/A		RL502 (85)
2	WHT	P5	18 AWG	GXL	N/A		X500 (4)

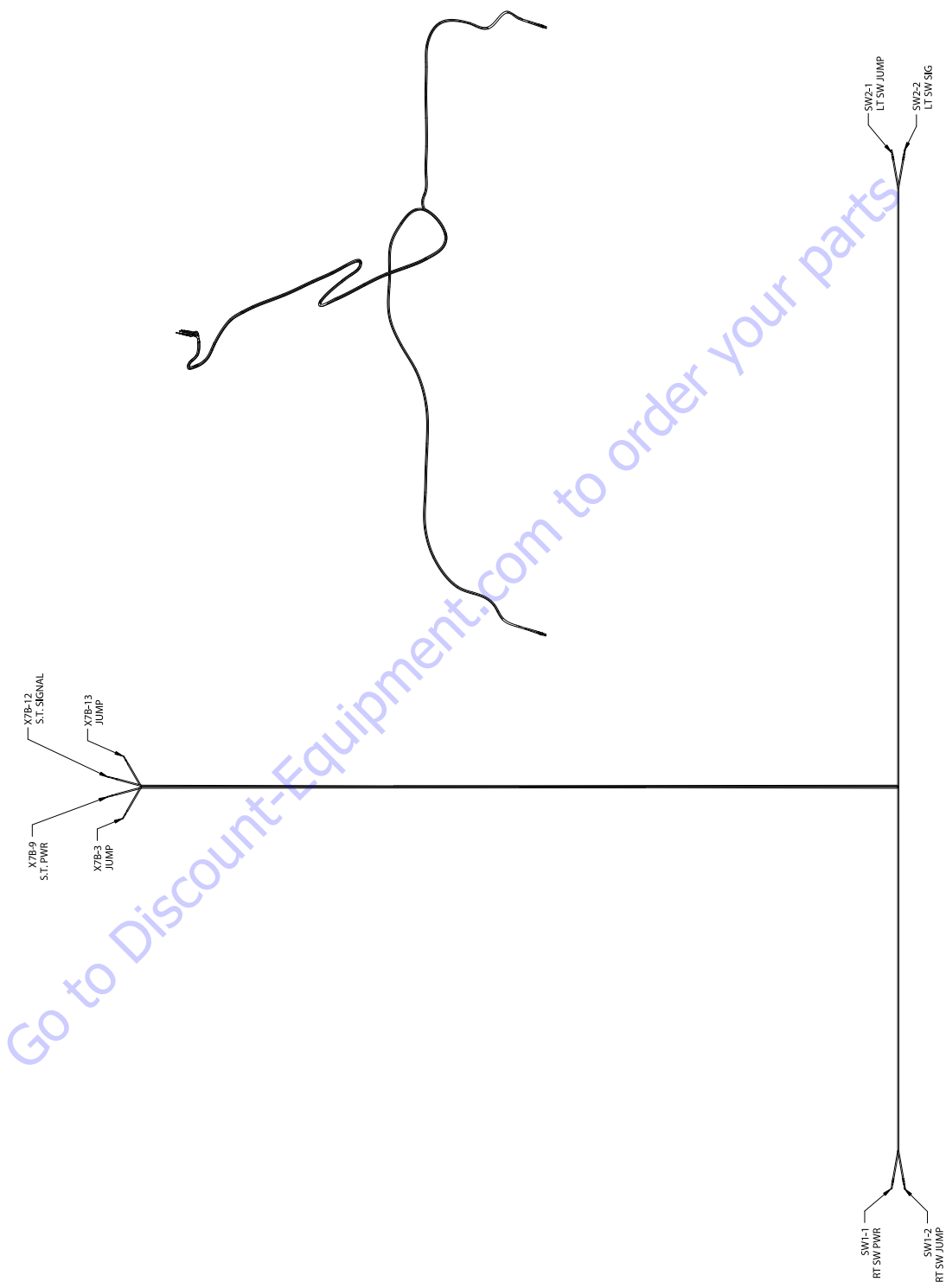
**RL503 - SKYGUARD RELAY #1**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
30	WHT	PF-1	18 AWG	GXL	100116720		IP114 (1)
85	WHT	PF-1	18 AWG	GXL	100118388		S191 (1)
86	WHT	PA-1	18 AWG	GXL	100118388		S192 (1)
87	WHT	P1	18 AWG	GXL	100116720		X58 (4)
87A							

**RL502 - SKYGUARD RELAY #2**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
30	WHT	PF-2	18 AWG	GXL	100116720		IP114 (1)
85	WHT	PF-2	18 AWG	GXL	100118388		S191 (1)
86	WHT	PA-2	18 AWG	GXL	100118388		S192 (1)
87	WHT	P3	18 AWG	GXL	100116720		X58 (5)
87A							

Figure 7-64. Gen to Plate Interface Harness



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Figure 7-65. Soft Touch Harness - Sheet 1 of 2

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**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**

X7B-13-JUMP							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	1-551-3 JUMPER	18 AWG	GXL	N/A		SW2-1 (1)

X7B-12-S.T. SIGNAL							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	124-5-2 ST SWITCH	18 AWG	GXL	N/A		SW2-2 (1)

X7B-9-S.T. PWR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-25-2 ST PWR	18 AWG	GXL	N/A		SW1-1 (1)

X7B-3-JUMP							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	1-551-2 JUMPER	18 AWG	GXL	N/A		SW1-2 (1)

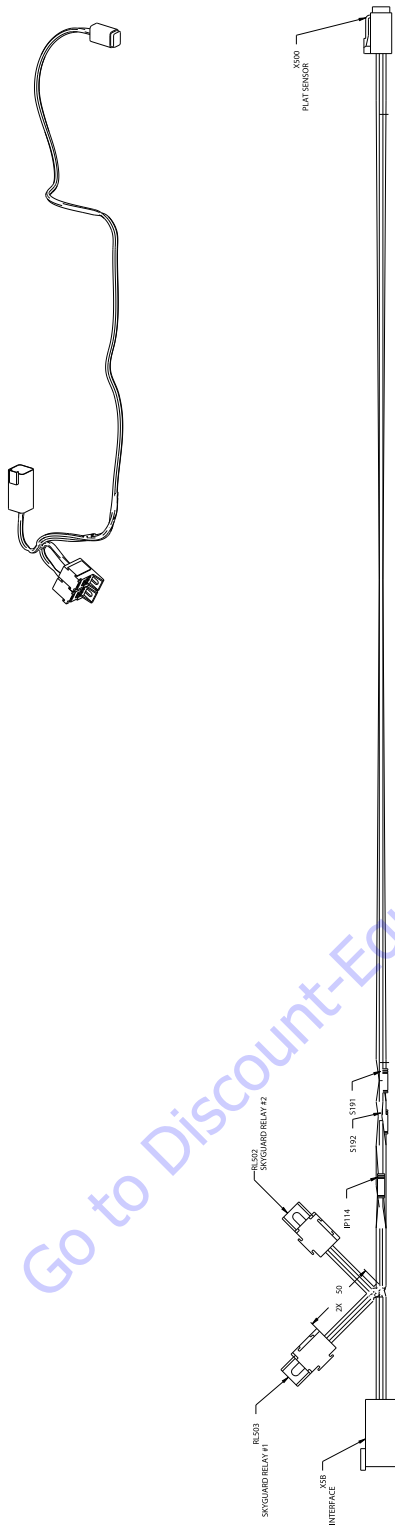
SW1-1-RT SW PWR							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	3-25-2 ST PWR	18 AWG	GXL	N/A		X7B-9 (1)

SW1-2-RT SW JUMP							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	1-551-2 JUMPER	18 AWG	GXL	N/A		X7B-3 (1)

SW2-1-LT SW JUMP							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	1-551-2 JUMPER	18 AWG	GXL	N/A		X7B-3 (1)

SW2-2-LT SW SIG							
CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	124-5-2 ST SWITCH	18 AWG	GXL	N/A		X7B-12 (1)

**Figure 7-66. Soft Touch Harness - Sheet 2 of 2**



**X500 - PLAT SENSOR**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P10	18 AWG	GXL	4460465		IP114 (2)
2	WHT	P5	18 AWG	GXL	4460465		X502 (2)
3	WHT	P4	18 AWG	GXL	4460465		S192 (2)
4	WHT	P5	18 AWG	GXL	4460465		S191 (2)

**IP114**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P2	18 AWG	GXL	N/A		X501 (1)
1	WHT	P4	18 AWG	GXL	N/A		RL503 (30)
2	WHT	P2	18 AWG	GXL	N/A		RL502 (30)
2	WHT	P10	18 AWG	GXL	N/A		X500 (1)

**X500 - INTERFACE**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P2	18 AWG	GXL	4460464		IP114 (1)
2	WHT	P5	18 AWG	GXL	4460464		X500 (2)
3	WHT	P1	18 AWG	GXL	4460465		RL503 (87)
4	WHT	P3	18 AWG	GXL	4460464		RL502 (87)
5	WHT	P3	18 AWG	GXL	4460464		
6							

**S192**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P4-1	18 AWG	GXL	N/A		RL503 (86)
2	WHT	P4-2	18 AWG	GXL	N/A		RL502 (86)
2	WHT	P4	18 AWG	GXL	N/A		X500 (3)

**S191**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
1	WHT	P5-1	18 AWG	GXL	N/A		RL503 (85)
2	WHT	P5-2	18 AWG	GXL	N/A		RL502 (85)
2	WHT	P5	18 AWG	GXL	N/A		X500 (4)

**RL503 - SKYGUARD RELAY #1**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
30	WHT	P4-1	18 AWG	GXL	100116720		IP114 (1)
85	WHT	P5-1	18 AWG	GXL	100118388		S191 (1)
86	WHT	P4-1	18 AWG	GXL	100118388		S192 (1)
87	WHT	P1	18 AWG	GXL	100116720		X500 (4)
87A							

**RL502 - SKYGUARD RELAY #2**

CONN POS	WIRE COLOR	WIRE LABEL	GAUGE	JACKET	TERMINAL P/N	SEAL P/N	TO
30	WHT	P4	18 AWG	GXL	100116720		IP114 (1)
85	WHT	P5	18 AWG	GXL	100118388		S191 (1)
86	WHT	P4	18 AWG	GXL	100118388		S192 (1)
87	WHT	P3	18 AWG	GXL	100116720		X500 (3)
87A							

Figure 7-67. Gen 2 Plate Interface Harness



## ELECTRICAL SCHEMATIC

### **SHEET 2: PLATFORM CONSOLE**

CONSOLE HARNESS  
PLATFORM BEACON

### **SHEET 3: PLATFORM AND BOOM COMPONENTS**

UPPER VALVE HARNESS  
BOOM LIMIT SWITCH HARNESS  
TRANSPORT LIMIT SWITCH HARNESS  
TRANSPORT BOOM HARNESS  
LSS HARNESS

### **SHEET 4: CHASSIS, TURNTABLE, AND UGM**

LOWER VALVE HARNESS  
TURNTABLE HARNESS  
AMBER BEACON

### **SHEET 5: GROUND USER INTERFACE**

GROUND PANEL HARNESS

### **SHEET 6: TRACTION SYSTEM**

TRACTION HARNESS  
STEERING SNSR HARNESS  
TRACTION TO TURNTABLE HARNESS

### **SHEET 7: OPTIONS**

GENERATOR

### **SHEET 8: OPTIONS**

CHASSIS HEAD/TAIL LIGHT  
INVERTER IGN  
PLATFORM WORK LIGHT  
GENERATOR IGN  
SKY GUARD  
SOFT TOUCH

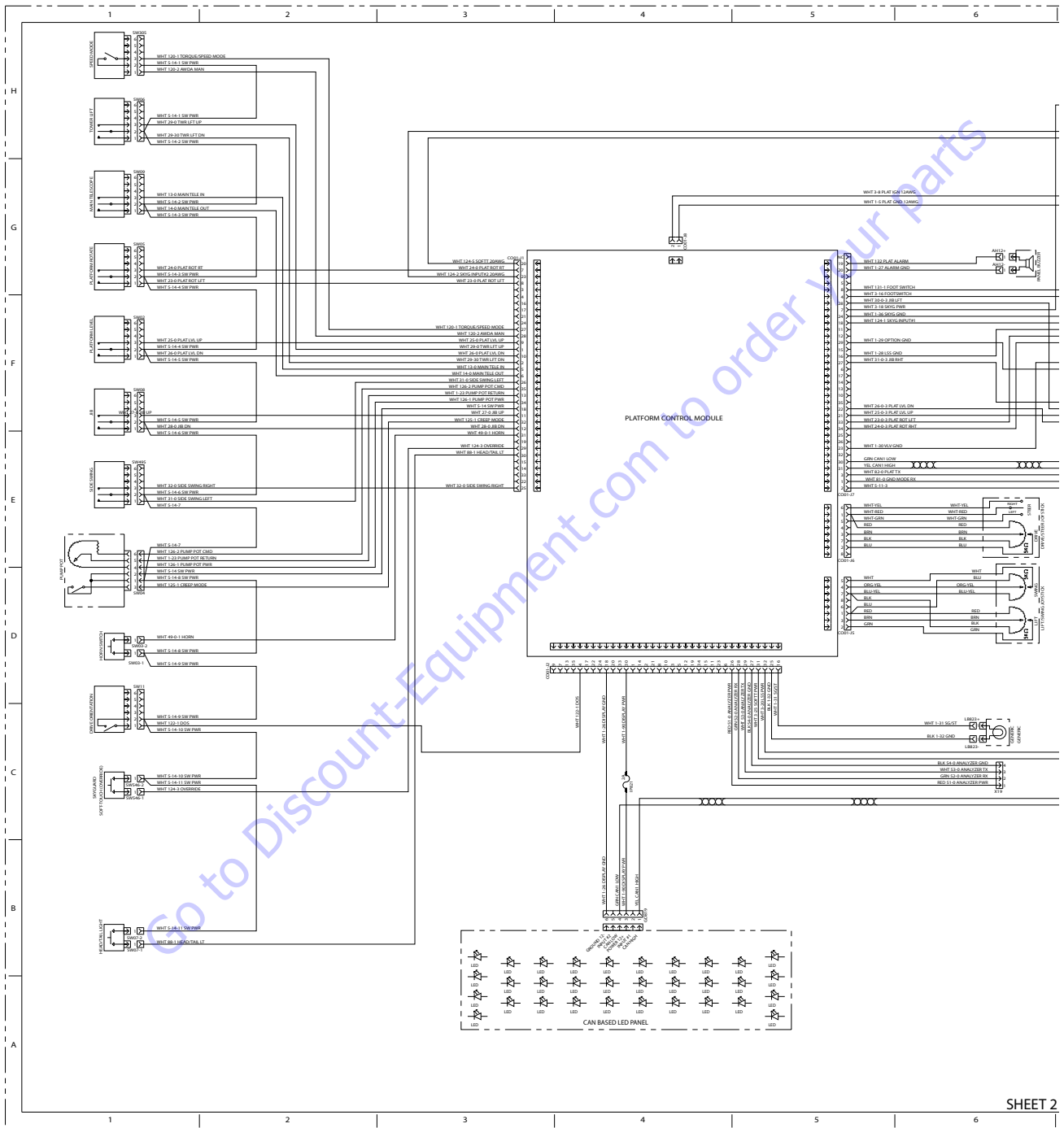
### **SHEET 9: PLATFORM**

GEN 2 PLAT INTERFACE  
COMMON SG3/EDS HARNESS  
BOX, SKYGUARD 2 HARNESS

SHEET 1

1001245674-B

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**



SHEET 2

**Figure 7-68. Electrical Schematic - Sheet 1 of 15**

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

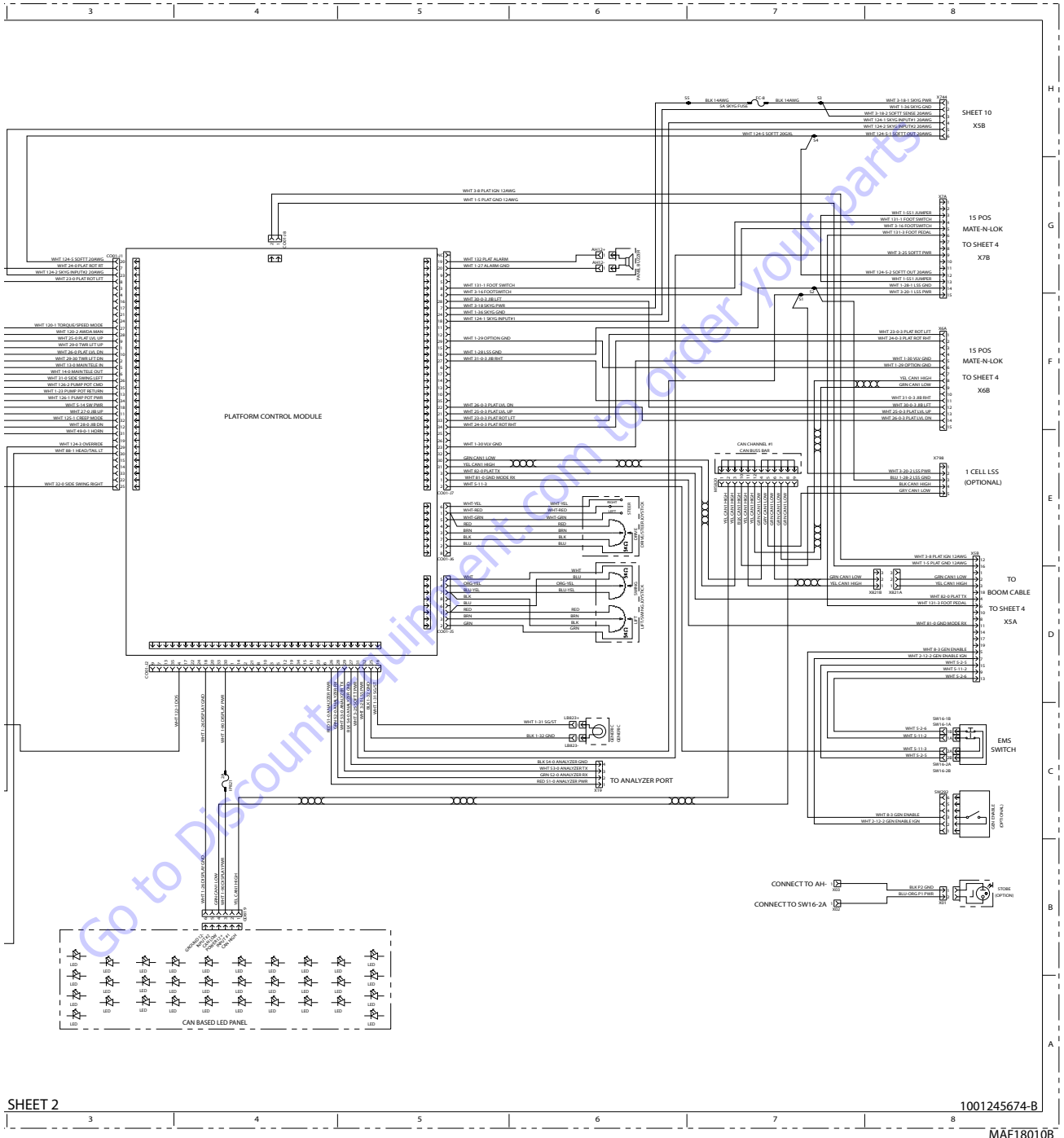


Figure 7-69. Electrical Schematic - Sheet 2 of 15



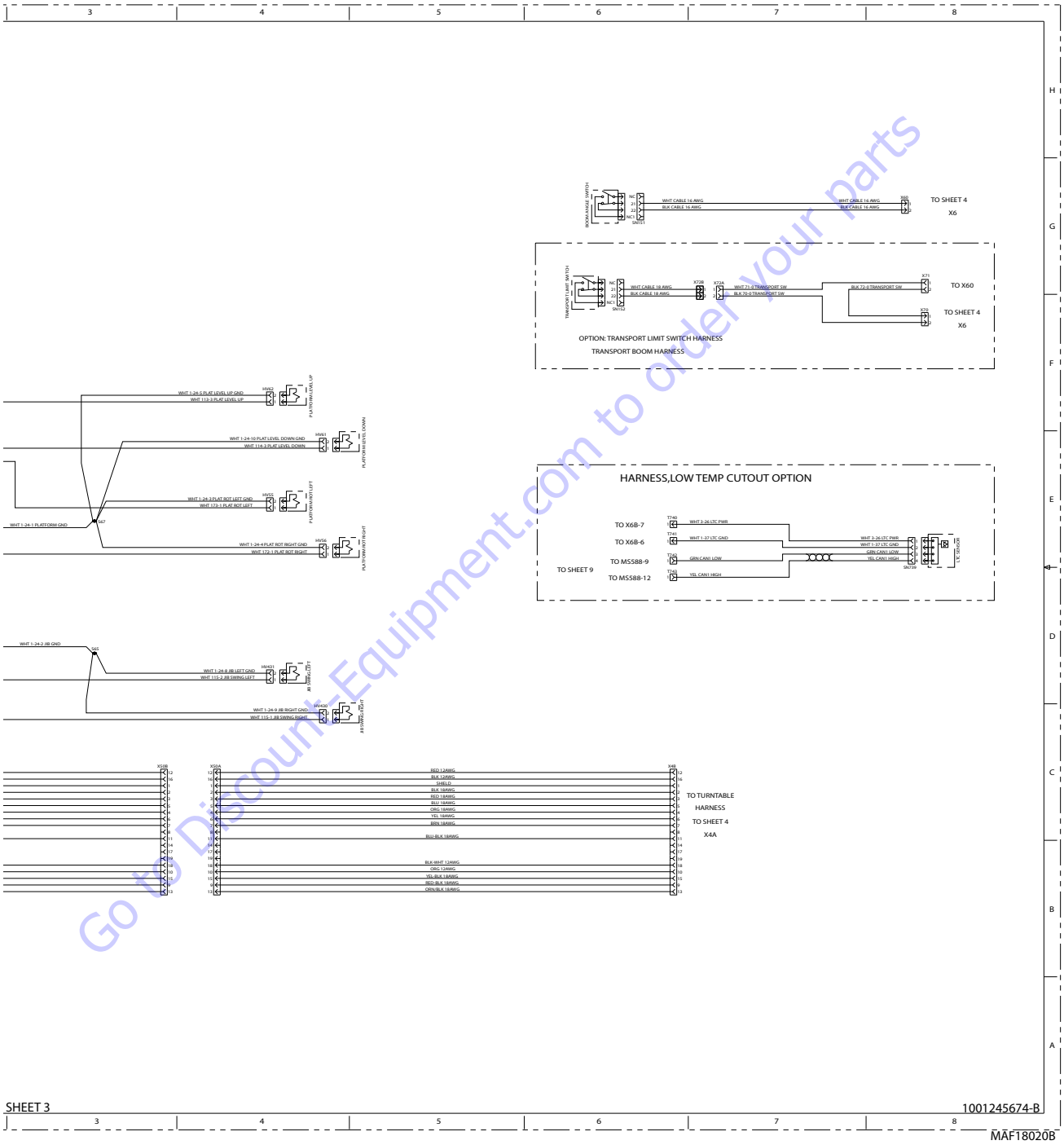


Figure 7-71. Electrical Schematic - Sheet 4 of 15

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

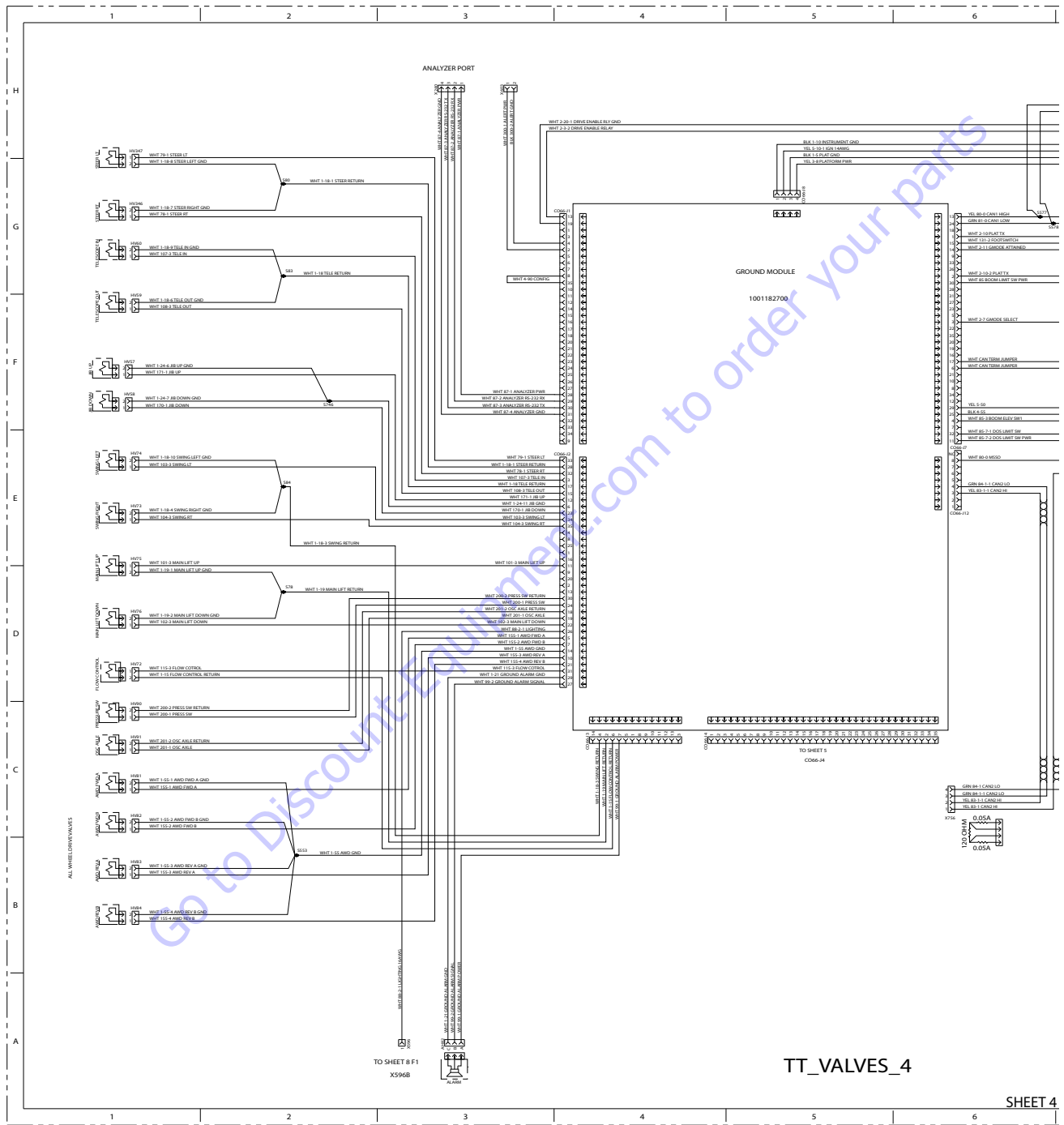


Figure 7-72. Electrical Schematic - Sheet 5 of 15

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

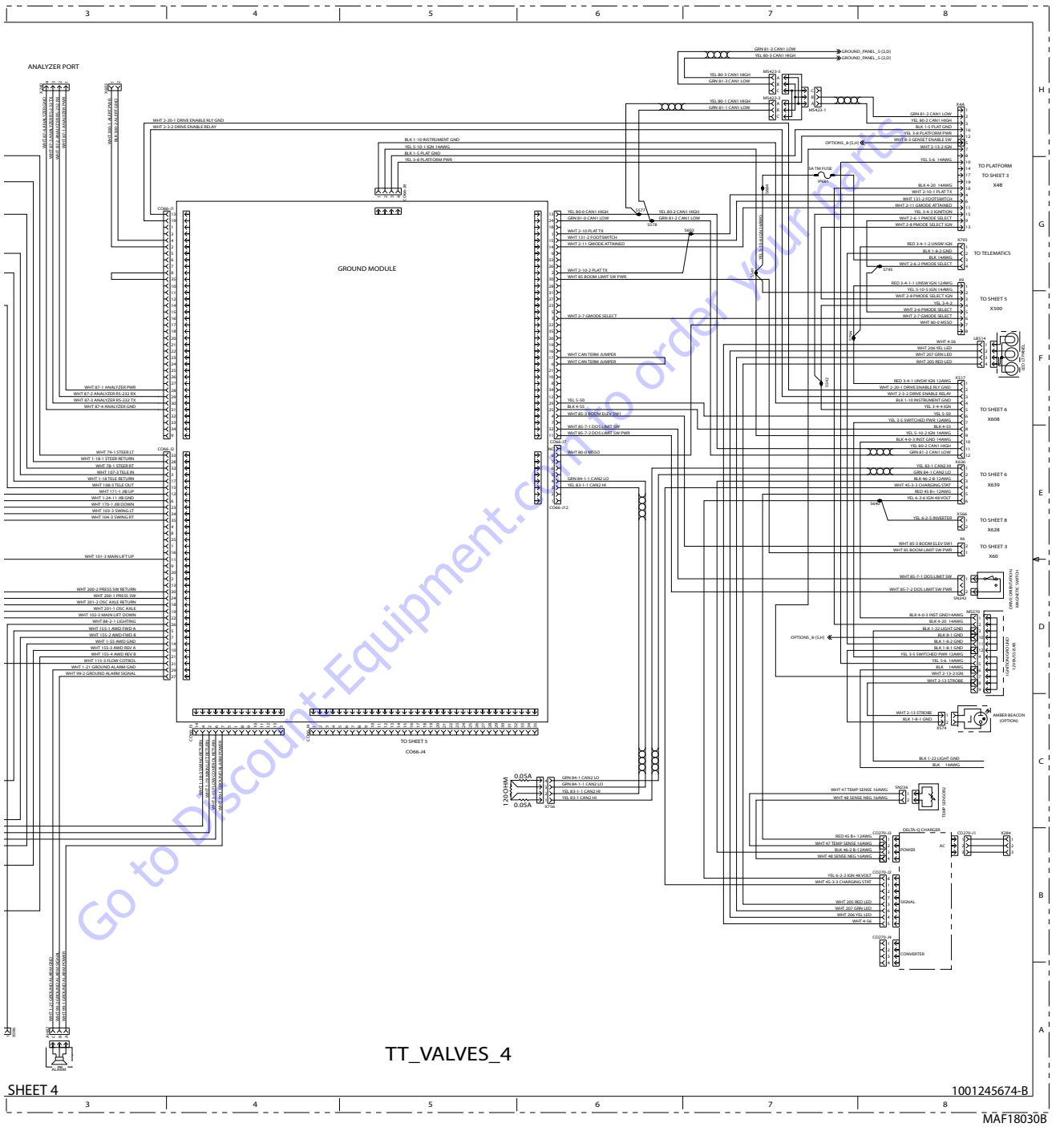
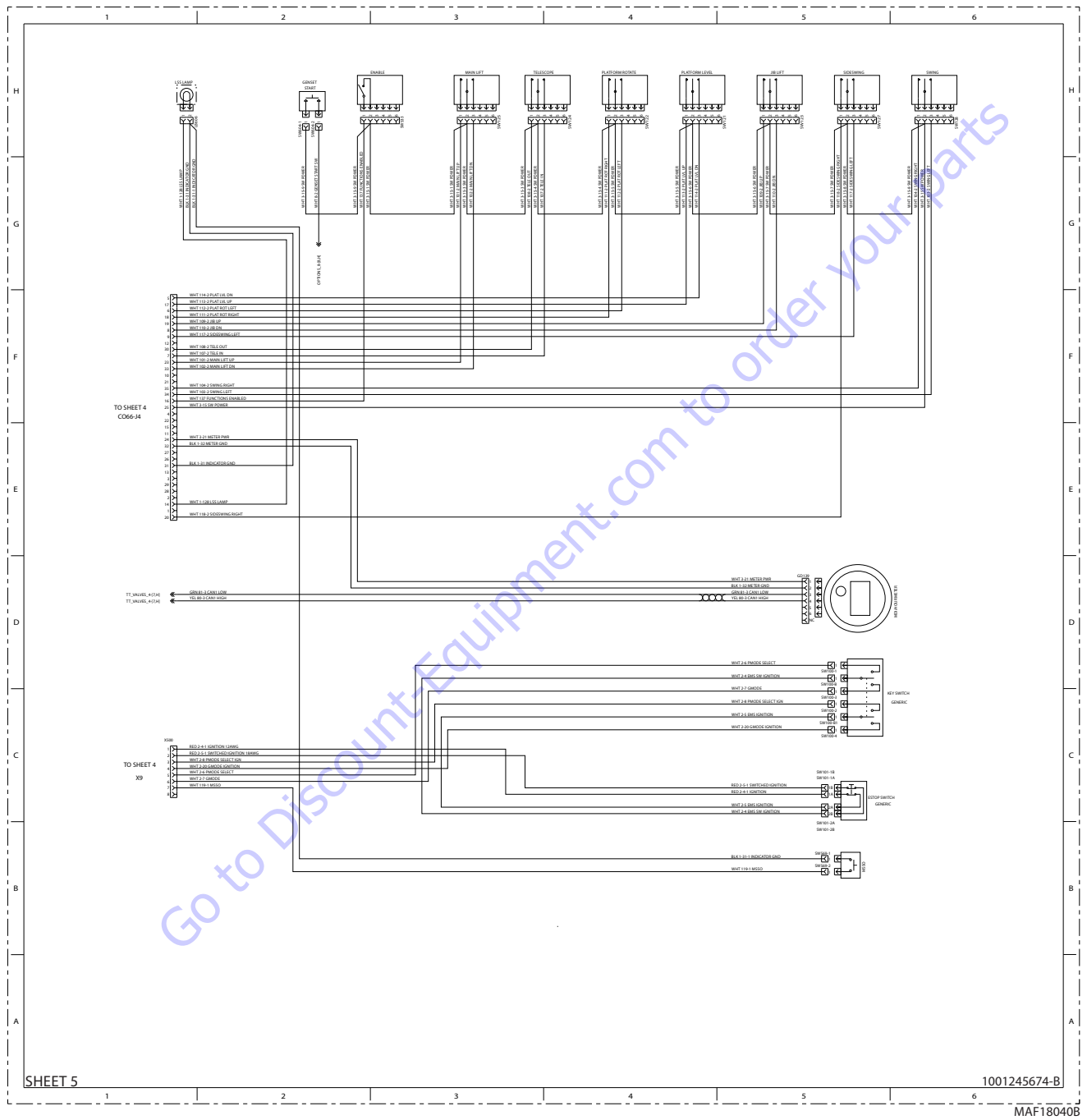


Figure 7-73. Electrical Schematic - Sheet 6 of 15

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**



**Figure 7-74. Electrical Schematic - Sheet 7 of 15**



# SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

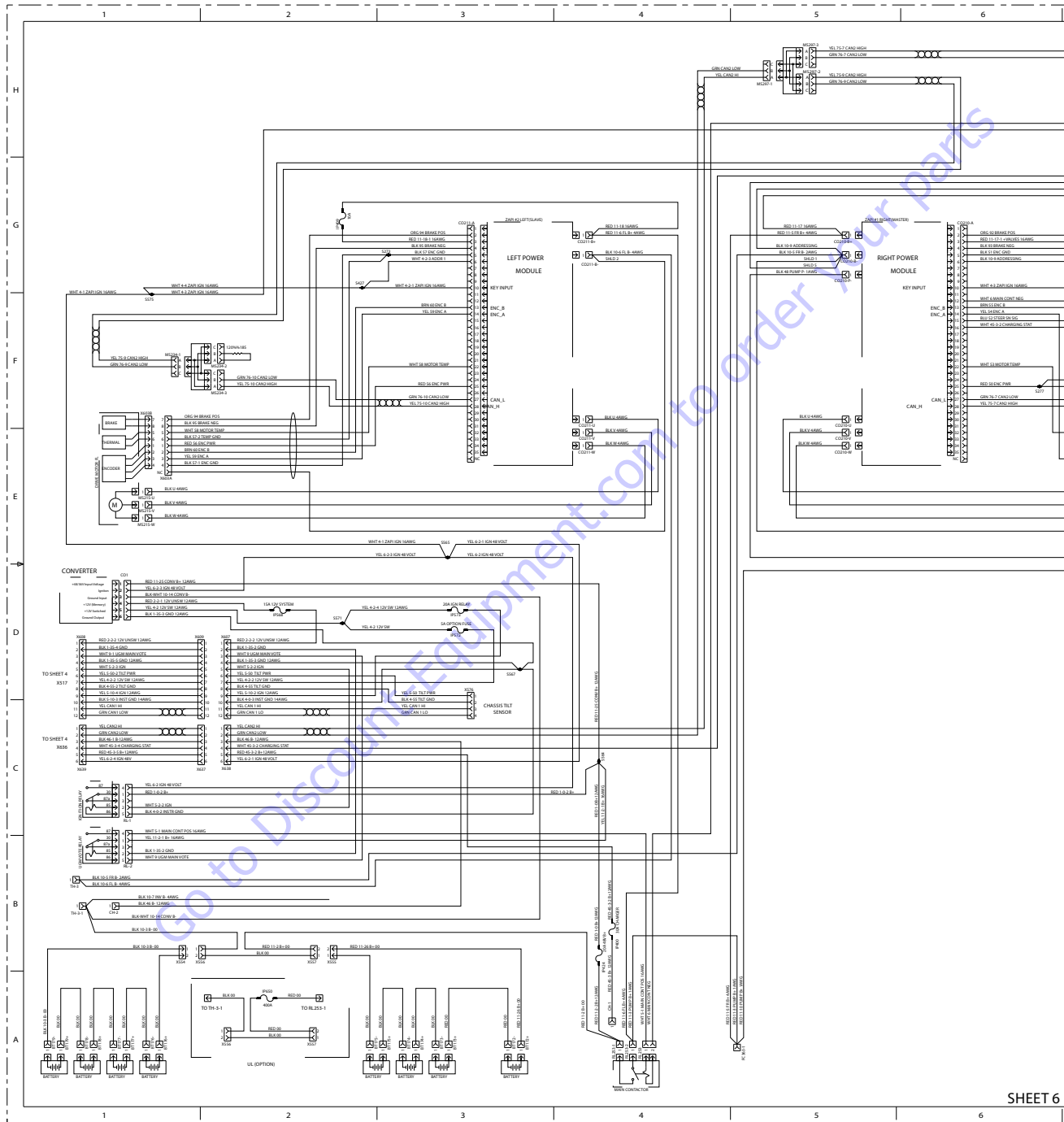
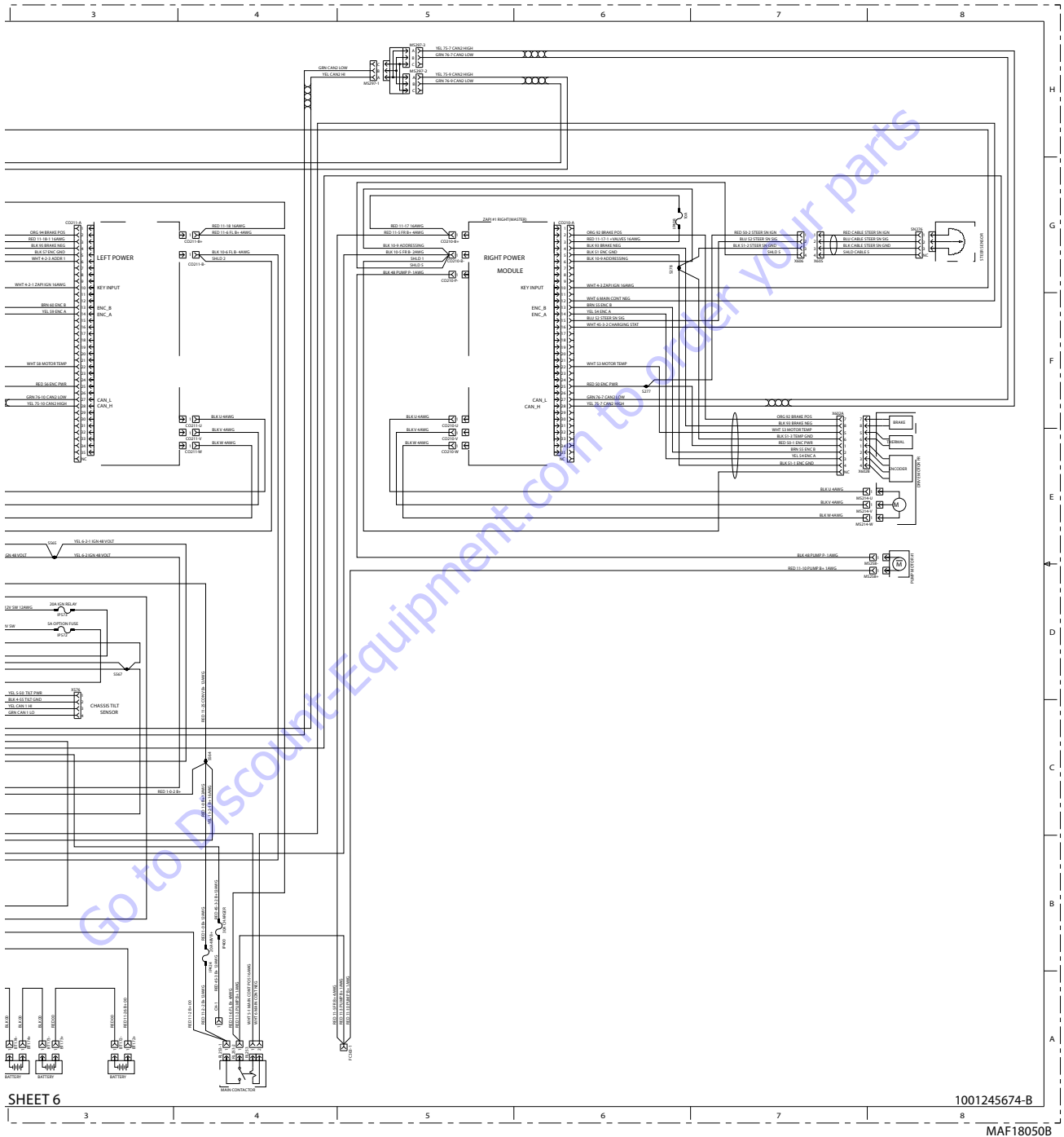


Figure 7-75. Electrical Schematic - Sheet 8 of 15



SHEET 6

1001245674-B

MAF18050B

Figure 7-76. Electrical Schematic - Sheet 9 of 15

# SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

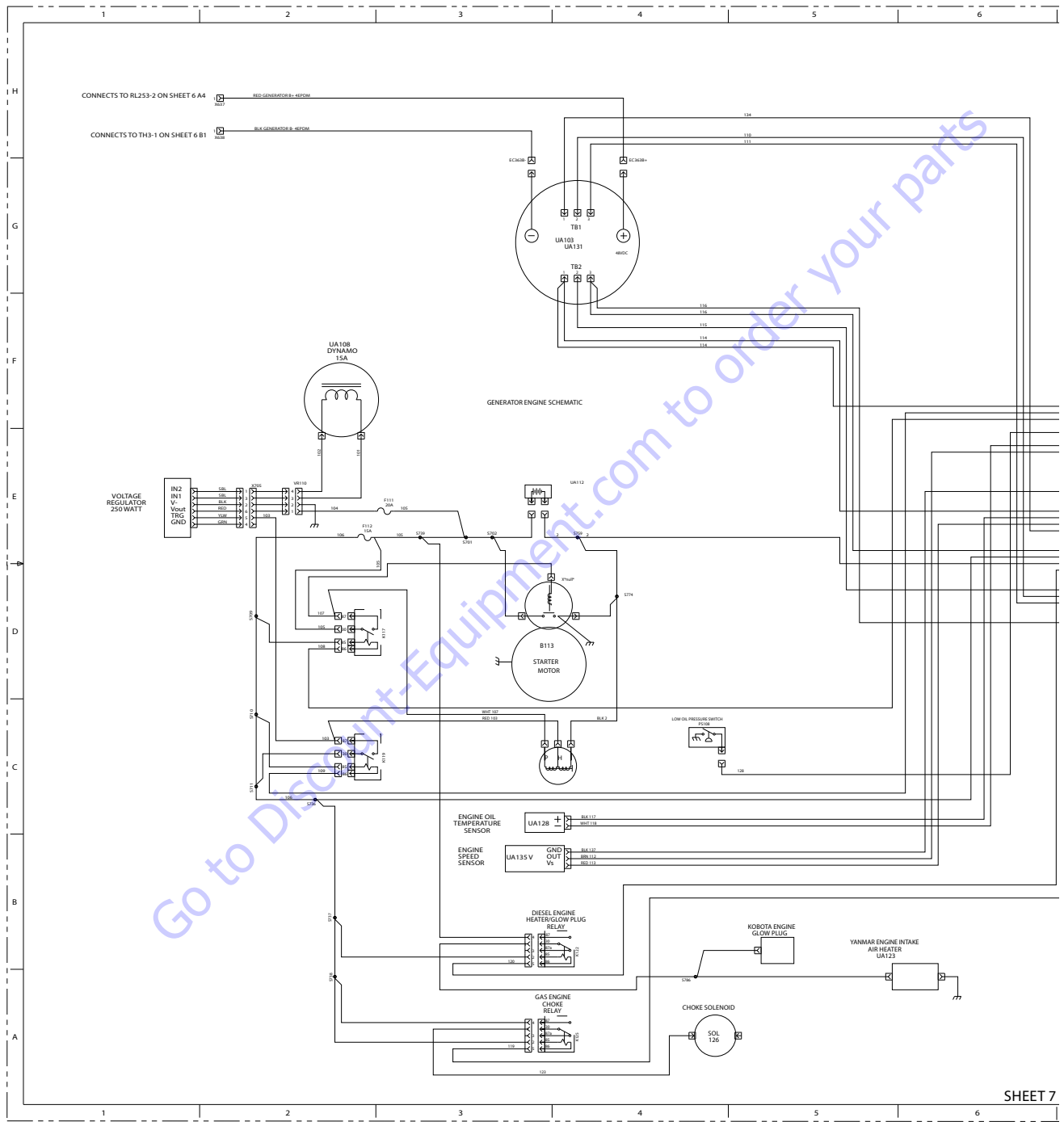


Figure 7-77. Electrical Schematic - Sheet 10 of 15

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

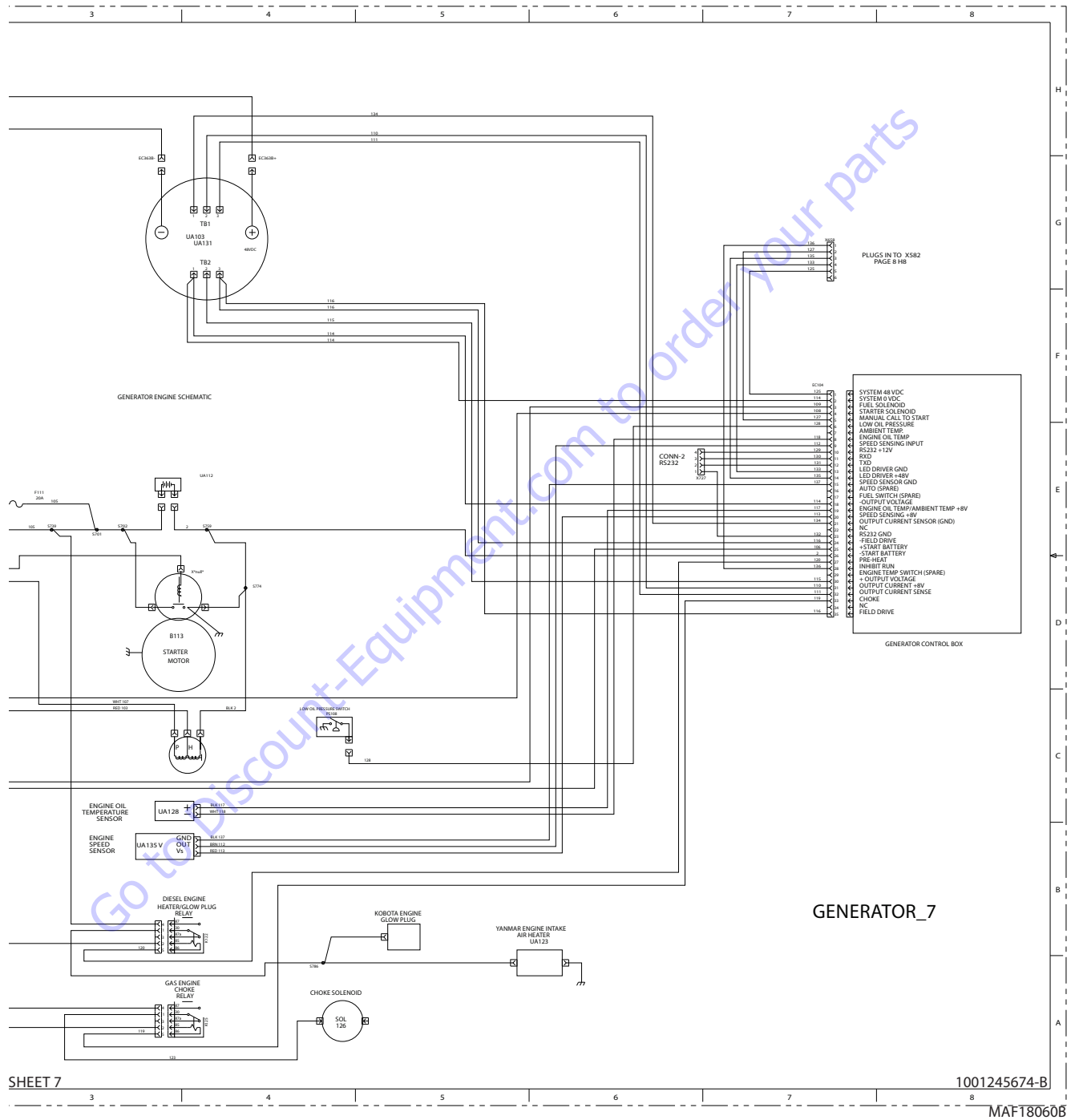
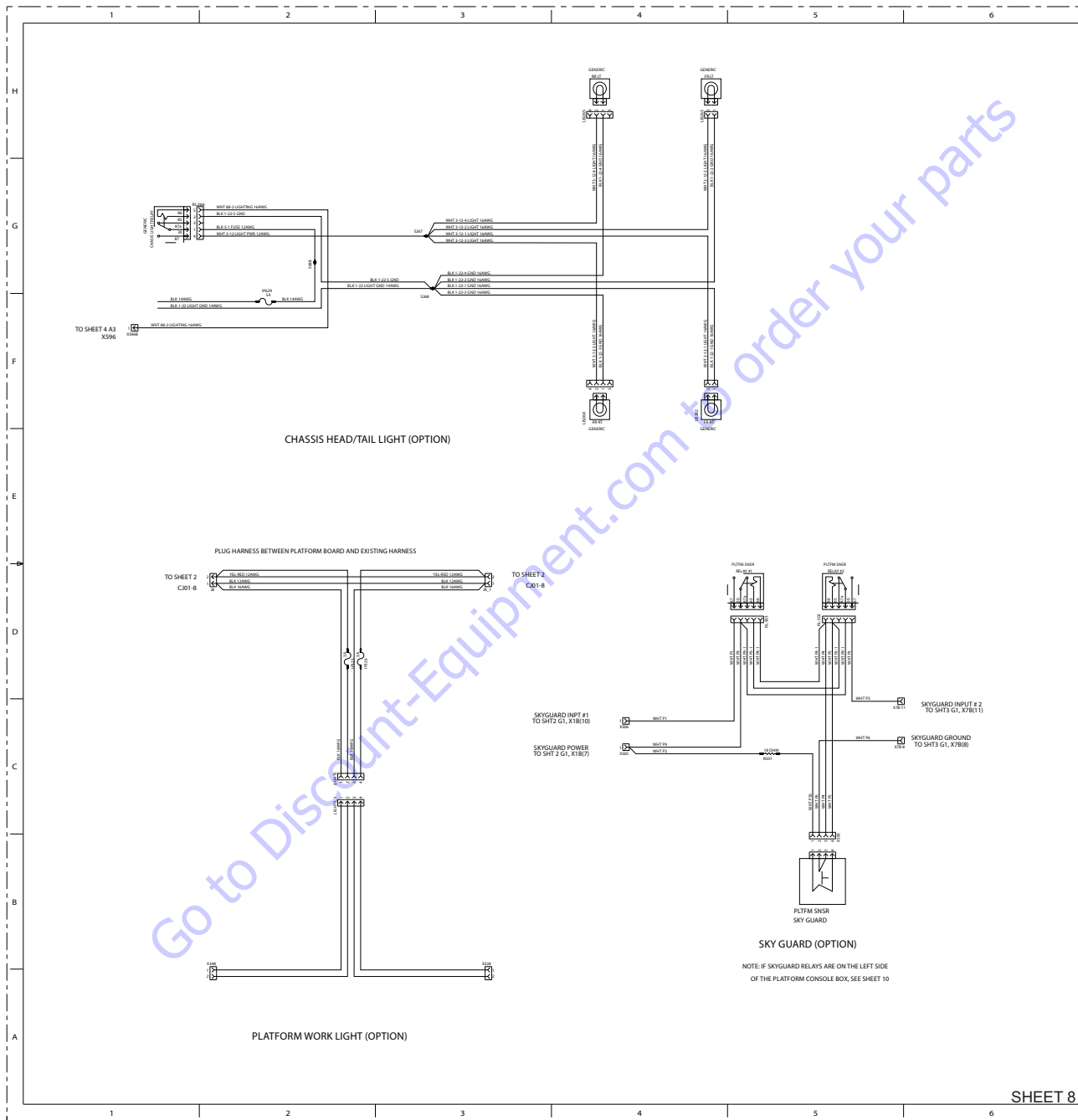


Figure 7-78. Electrical Schematic - Sheet 11 of 15

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**



**Figure 7-79. Electrical Schematic - Sheet 12 of 15**

SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS

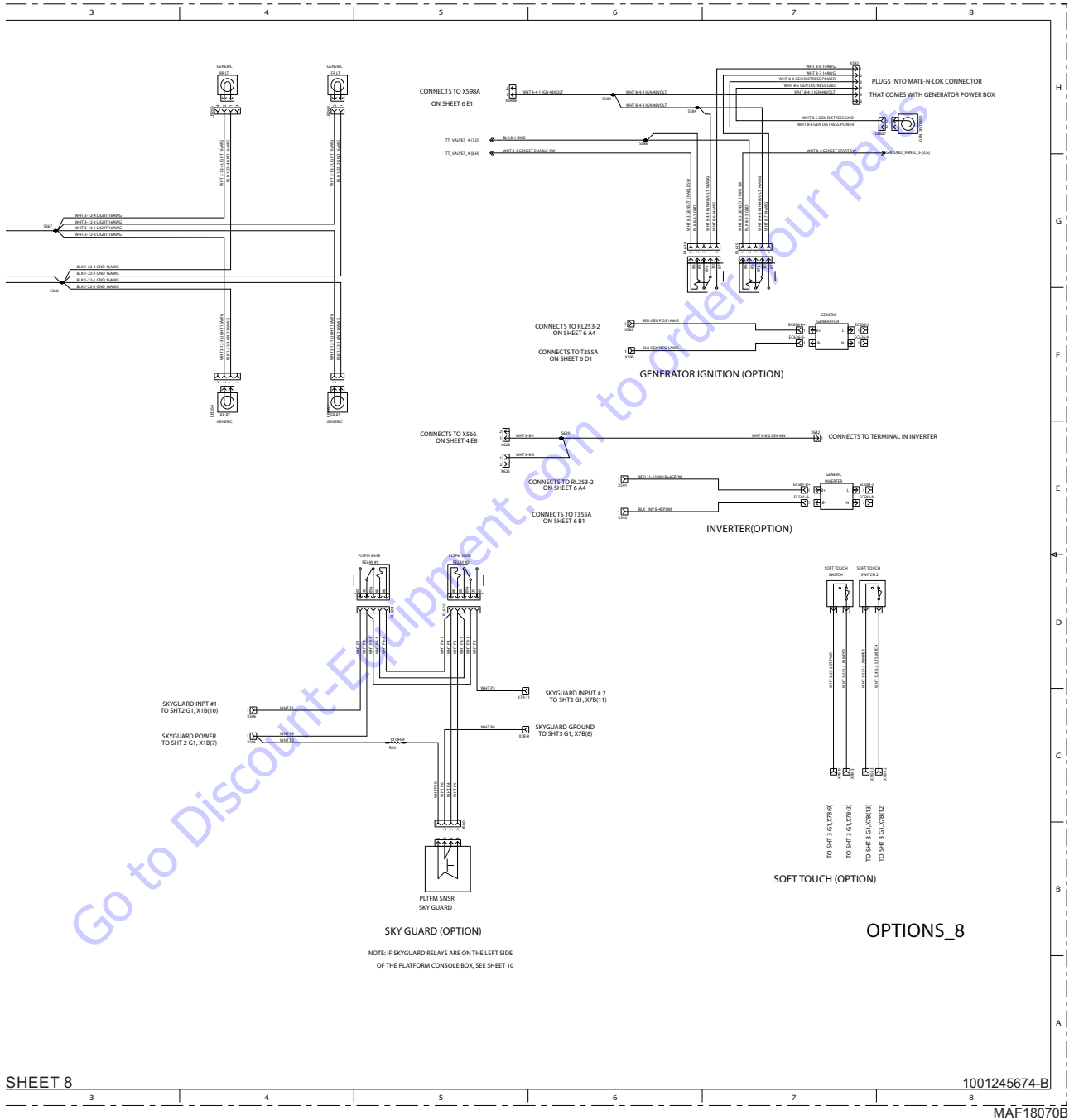
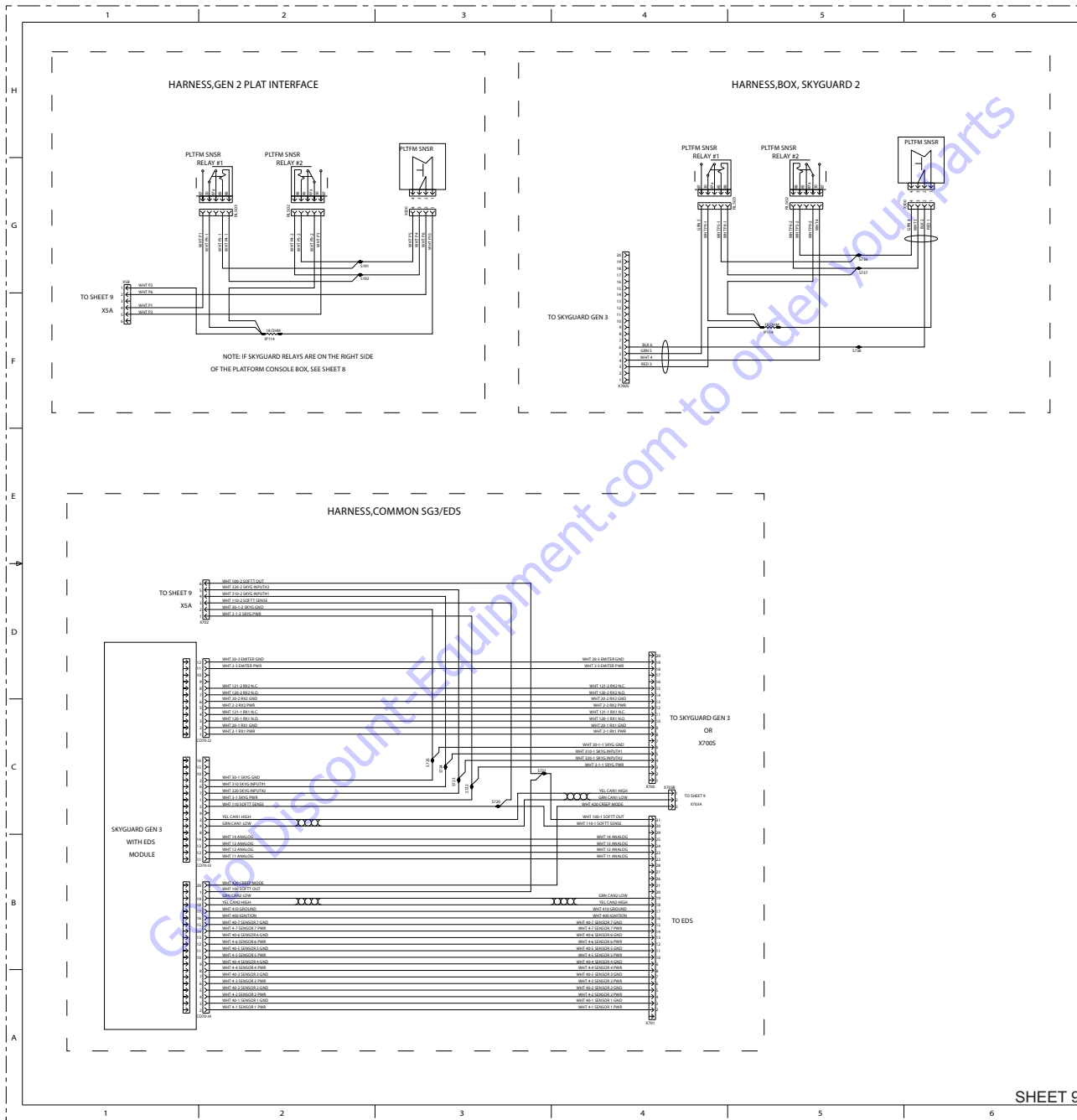


Figure 7-80. Electrical Schematic - Sheet 13 of 15

**SECTION 7 - BASIC ELECTRICAL INFORMATION & SCHEMATICS**



SHEET 9

**Figure 7-81. Electrical Schematic - Sheet 14 of 15**

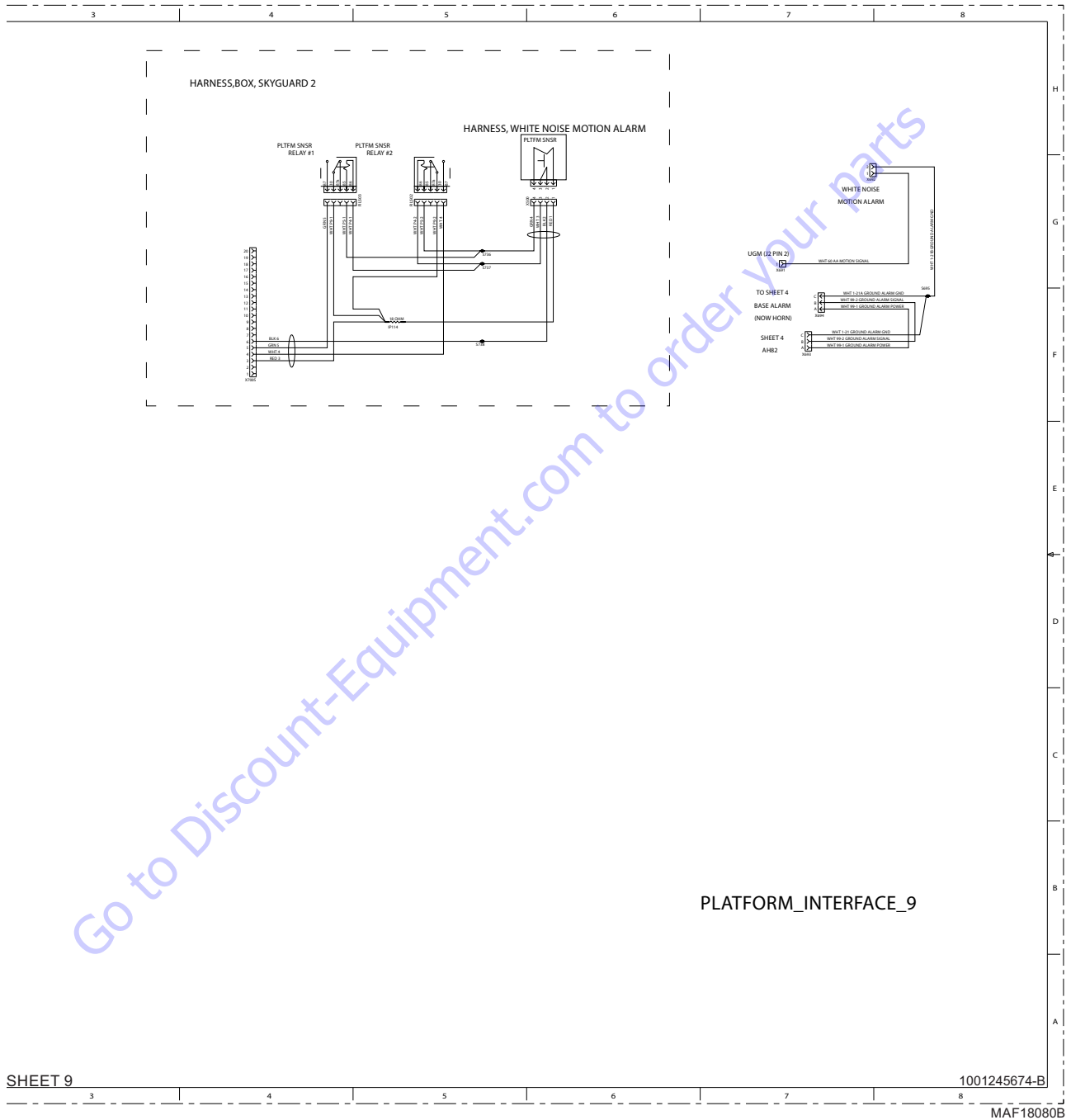


Figure 7-82. Electrical Schematic - Sheet 15 of 15



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