

Service Manual

AB62 Work Platform

Serial Numbers 1266 - Current

Publication Number: 104045-001

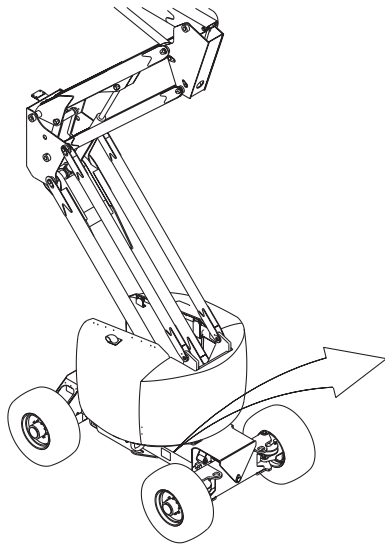
UpRight

AB62

Aerial Work Platform

Serial Numbers 1266 - Current

When contacting UpRight for service or parts information, be sure to include the MODEL and SERIAL NUMBERS from the equipment nameplate. Should the nameplate be missing, the SERIAL NUMBER is also stamped on top of the chassis above the front axle pivot.



UpRight Inc.	
1775 PARK ST. SELMA CALIFORNIA 93662 USA	
Model: _____	Serial number: _____
GVW: _____ lbs. _____ kg.	Mfg. date: _____
Maximum allowable incline of machine when elevated: _____ deg.	
Occupants and equipment must not exceed the rated maximum load: _____ lbs. _____ kg	
Maximum platform occupants: _____	
Maximum allowable side force on platform: _____ lbs. _____ N	
Maximum platform height: _____ ft. _____ m	
Maximum platform reach: _____ ft. _____ m	
Maximum allowable wind speed: _____ mph _____ km/h	
Maximum hydraulic system pressure: _____ psi _____ bar	
Maximum system voltage: _____ vdc	
This machine is manufactured to comply with ANSI A92.5-1992.	
CAUTION: CONSULT OPERATOR'S MANUAL BEFORE USE.	
THIS PLATFORM IS NOT ELECTRICALLY INSULATED	

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FOREWORD

This manual contains instructions for the maintenance of the machine. Referring to the Operator Manual will aid in understanding the operation and function of the various components and systems of the machine, and help in diagnosing and repair of the machine.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice. No part of this publication may be reproduced, stored in retrieval system, or transmitted, in any form by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. This includes text, figures and tables.

This manual consists of five (5) parts.

OPERATOR MANUAL

A copy of the Operator Manual that is stored on every UpRight Aerial Work Platform.

SECTION 1 - GENERAL INFORMATION

Contains generic information relevant to all UpRight Aerial Work Platforms.

SECTION 2 - SERVICE AND REPAIR

Detailed information specific to this UpRight Aerial Work Platform.

SECTION 3 - TROUBLESHOOTING

Causes and solutions to typical problems.

SECTION 4 - SCHEMATICS

Electric and Hydraulic schematics.

NOTES:

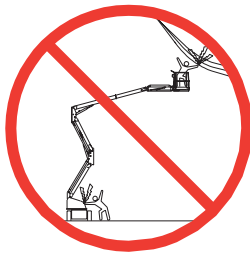
OPERATOR MANUAL

WARNING

All personnel shall carefully read, understand and follow all safety rules and operating instructions before operating or performing maintenance on any UpRight aerial work platform.

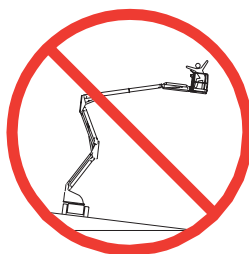
Safety Rules

Electrocution Hazard



NEVER operate the machine within ten (10) feet of power lines.
THIS MACHINE IS NOT INSULATED.

Tip Over Hazard



NEVER operate the boom or drive with the platform elevated unless on firm, level surface.

Collision Hazard



NEVER position the platform without first checking for overhead obstructions or other hazards.

Fall Hazard



NEVER climb, stand or sit on the platform guardrails or midrail.

- **ALL OCCUPANTS** must wear an approved fall restraint properly attached to a designated anchorage point. Attach only one fall restraint to each anchorage point.
- **NEVER** exceed the maximum platform load. See "Specifications" on page 20.
- **OPERATE** the machine only on surfaces capable of supporting wheel loads.
- **NEVER** operate the machine when wind speeds exceed 12.5 m/sec (**28 mph**).
- **NEVER** exceed 200 Nm (**45 lbs.**) of side force per occupant.
- **NEVER** operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps, curbs, or debris.
- **ALWAYS** close and secure entrance after entering the platform.
- **NEVER** use ladders or scaffolding on the platform.
- **NEVER** attach overhanging loads or use the aerial work platform as a crane or lifting tool.
- **LOOK** up, down and around for overhead obstructions and electrical conductors.
- **DISTRIBUTE** all platform loads evenly on the platform.
- **NEVER** use damaged equipment. (Contact UpRight for instructions. See toll free phone number on inside back cover.)
- **NEVER** change operating or safety systems.
- **INSPECT** the machine thoroughly for cracked welds, loose or missing hardware, hydraulic leaks, damaged cables or hoses, loose wire connections, and wheel bolts.
- **NEVER** climb down the elevating assembly when the platform is elevated.
- **IF ALARM SOUNDS** while the platform is elevated, **STOP**, carefully lower the platform. Move the machine to a firm, level surface.
- **IN CASE OF EMERGENCY** push the Emergency Stop button to cut power to all machine functions.
- **NEVER** recharge batteries near sparks or open flame; batteries that are being charged emit explosive hydrogen gas.
- **NEVER** replace any component or part with anything other than original UpRight replacement parts without the manufacturer's written consent.
- **VERIFY** that all labels are in place and legible before using.
- **NEVER** tow the machine. Transport by truck or trailer only.
- **AFTER USE**, secure the work platform against unauthorized use by turning key switches off and removing all keys.

California Proposition 65 Warning

Gasoline and diesel engine exhaust and some of their constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Battery Posts, terminals and related accessories contain lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

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INTRODUCTION

This manual covers the operation of the AB62 Articulated Boom. **This manual must be stored on the machine at all times.**

GENERAL DESCRIPTION

Figure 2: AB62 Work Platform

1. Platform

- The platform has a non-slip aluminum floor, guardrails with midrail, toeboards, and an entrance gate at the rear of the platform.

2. Platform Controls

- The Platform Controller is located at the front of the platform cage. The foot switch must be depressed to operate any function from the platform.

3. Riser

- Used to raise the platform.

4. Boom

- Used to extend the platform.

5. Jib

- Used to level and rotate the platform, and to raise or lower the platform at the end of the boom.

6. Power Module

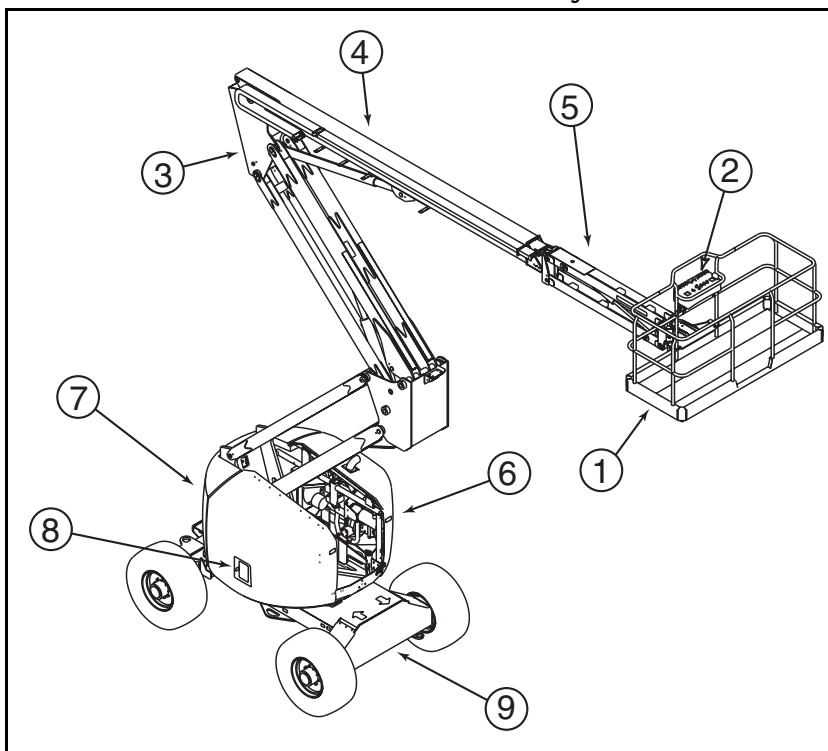
- The Power Module contains the engine and the hydraulic pump.

7. Control Module

- The Control Module contains the fuel tank, hydraulic fluid tank and components, the hydraulic manifold, the batteries, and the Chassis Controller.

8. Chassis Controls

9. Chassis



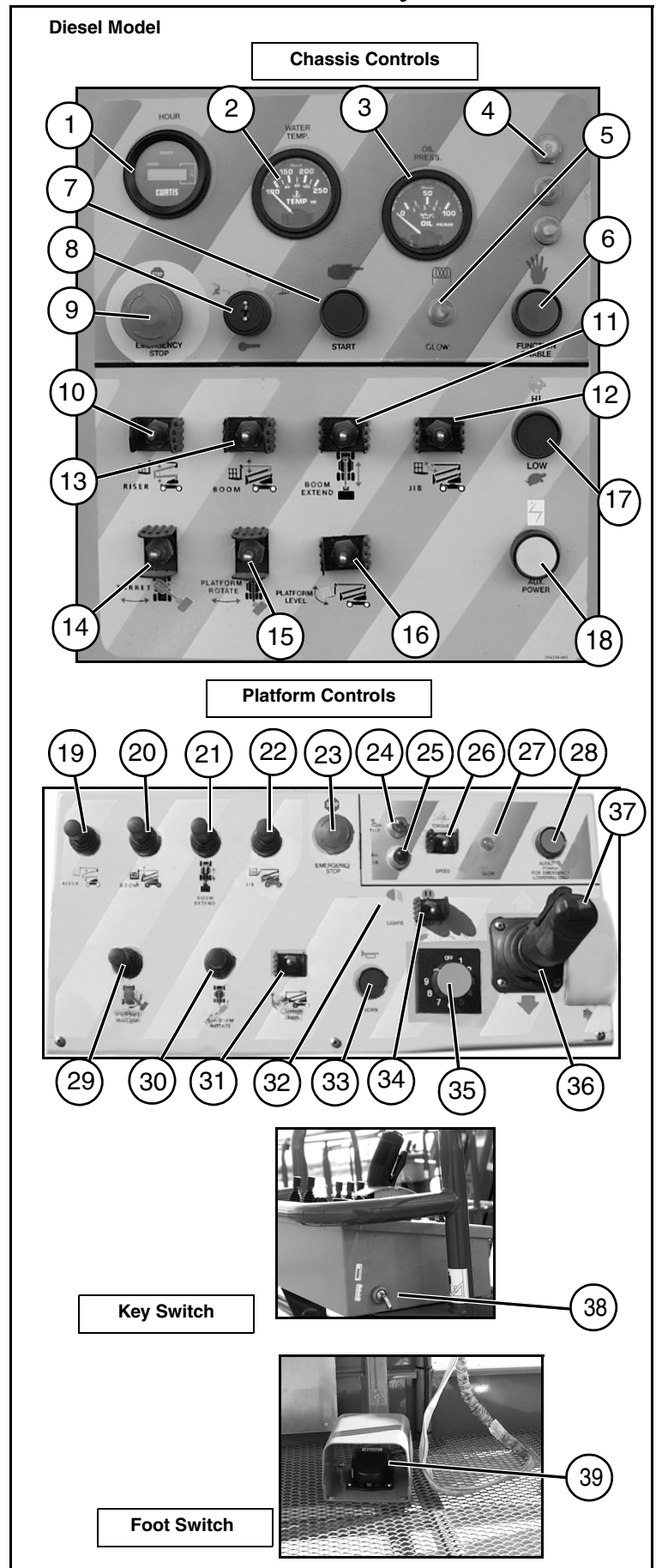
! WARNING !

DO NOT use the work platform without guardrails properly assembled and in place.

CONTROLS AND INDICATORS

Figure 3: Controls and Indicators

1. Hour Meter
2. Water Temp.
3. Oil Pressure
4. Breaker
5. Diesel - Glow Plug Light
Gasoline/LPG - Plugged
6. Function Enable
7. Engine Start
8. Key Switch
9. Emergency Stop
10. Riser
11. Boom Extend/Retract
12. Jib Raise/Lower
13. Boom Raise/Lower
14. Turret Rotate
15. Platform Rotate
16. Platform Level
17. Function Speed HI/LOW
18. Auxiliary Power
19. Riser
20. Boom Raise
21. Boom Extend
22. Jib Raise
23. Emergency Stop
24. YELLOW-Tilt
25. RED-Oil Pressure Warning
26. Torque / Speed
27. Diesel - Glow Plug Light
Gasoline/LPG - Fuel Selector Switch
28. Auxiliary Power
29. Turret Rotate
30. Cage Rotate
31. Cage Level
32. Auxiliary Light (option)
33. Horn
34. Generator (option)
35. Function Speed
36. Drive Control Handle
37. Steering Rocker Switch
38. Key Switch
39. Foot Switch



PRE-OPERATION SAFETY INSPECTION

VISUAL INSPECTION

NOTE: Carefully read, understand and follow all safety rules, labels, and operating instructions; then perform the following steps each day before use.

Perform a complete visual inspection of the entire unit prior to operating. Check the following areas for discrepancies:

1. Open the covers and check hydraulic components and hoses for damage or leaks.
2. Check electrical components and wiring for damage or loose connections.
3. Inspect the chassis, axles, hubs, and steering linkage for damage, deformation, buckled paint, loose or missing hardware, and cracked welds.
4. Air-filled tires: check for damage, punctures, and inflation; tire pressure must be 5.5 bar (**80 psi**).
5. Check all hoses and cables for wear.
6. Inspect the elevating assembly for damage, deformation, buckled paint, loose or missing hardware, and cracked welds.
7. Inspect the platform and guardrails for damage, deformation, buckled paint, loose or missing hardware, and cracked welds. Ensure that the gate operates freely and latches securely.
8. Check the hydraulic fluid level with the platform fully lowered.
9. Check the battery fluid level.
10. Check the fuel level; add fuel if necessary.
11. **Dual Fuel Models:** See "Switching Fuels (LPG Option)" on page 11.

NOTE: When using propane, use clean, water free liquid petroleum gas, preferably from a bulk storage tank.

! WARNING !

If you smell propane, close the supply valve on the tanks immediately until you have located and corrected the leak.

12. Ensure that the radiator is cold; check coolant level. Add if necessary.

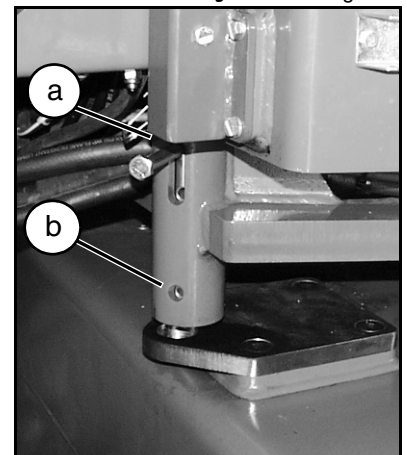
! WARNING !

NEVER remove the cap from a hot radiator. Hot coolant can cause severe burns.

13. Retract the locking pins.
 - The locking pins prevent turret rotation during transport and loading or unloading from a truck or trailer. There are two pins; one on each side, at the base of the turret, at the front of the machine.
 - a. Lift the locking pin with the pin stop rod.
 - b. Insert the snap pin into the bottom hole.

NOTE: Locking pins must be engaged for loading or unloading the machine onto a truck or trailer, and during transport.

Figure 4: Locking Pin



SYSTEM FUNCTION INSPECTION

1. Move the machine to a firm level surface with room to fully elevate and extend the platform.
2. Before performing the following tests, check the area around the machine and overhead for obstructions, holes, drop-offs, and debris.
3. Ensure that the locking pins are retracted (refer to Figure 4 on page 5).

CAUTION

Attempting to rotate the turret with locking pins engaged may cause damage to the machine.

4. Turn the chassis key switch to the left (CHASSIS).
5. Pull out the Emergency Stop switches to the ON position at the chassis control panel and at the platform control panel.
6. Turn the key switch ON.
 - a. **Gasoline/LPG:** Press the Engine Start button to crank the engine.
 - b. **Diesel:** Wait for Glow Plug light to go off. When the Glow Plug light goes off, start engine.
7. Push in the Chassis Emergency Stop button; the engine should stop. Return the Chassis Emergency Stop button to the ON position, and start the engine.
8. Push in the Platform Emergency Stop button; the engine should stop. Return the Platform Emergency Stop button to the ON position, and start the engine.
9. Make sure that the Function Speed Control (on the platform controls) is not at zero.
 - Operate each function switch on the lower control panel to raise/lower, extend/retract, rotate left/right, each section of the elevating assembly, and observe the operation of the machine.
 - All functions should operate through full cycle smoothly.
10. Stop the engine.
11. Turn chassis key switch to the right (PLATFORM).
12. Mount the platform, lower the bar, and attach an approved fall restraint to the designated platform anchorage point. Attach only one fall restraint to each point.
13. Start the engine.
14. Without depressing the foot switch, move the Drive Control handle; the machine should not function.
15. Depress the foot switch and move the Drive Control handle forward and reverse. Observe that the proportional functions operate smoothly, and that the brakes apply quickly after the control is released.
16. While depressing the foot switch, operate the steer switch to left and right. Observe that the steering wheels turn properly.
17. While depressing the foot switch, turn the Function Speed Control knob to the desired setting, and operate the boom controls.
 - Observe that the boom operates smoothly, and that the upper boom, jib, turret rotation, platform level, riser, and boom extend operate proportionally in conjunction with the Function Speed Control knob.
 - Observe that the platform maintains level when the boom is elevated.
18. With the upper boom elevated 0,3 m (1 ft.), operate the Drive Control handle. Observe that the drive speed is limited to creep (0,3 m [1 ft.] per second). Lower the upper boom to the stowed position.
19. With the upper boom extended 0,3 m (1 ft.), operate the Drive Control handle. Observe that the drive speed is limited to creep (0,3 m [1 ft.] per second). Retract the upper boom to the stowed position.
20. Press the Service Horn button. Observe that the horn is audible.

WARNING

DO NOT use a machine that is damaged or malfunctioning. Tag and remove the unit from service until it is repaired.

OPERATION

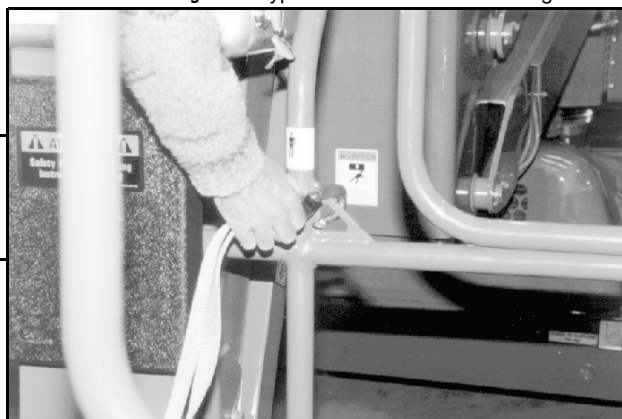
Before operating the work platform ensure that:

- Pre-operation and safety inspection has been completed, and any discrepancies have been corrected.
- The operator has been thoroughly trained on the operation of the machine.
- The work area is clear of all obstructions, holes, drop-offs, or persons in the route of travel.
- The surface is capable of supporting wheel loads.

WARNING

Always wear an approved fall restraint properly attached to the designated platform anchorage point when driving or elevating the machine. Attach only one fall restraint to each anchorage point.

Figure 5: Typical Fall Restraint Anchorage Point



CONTROLLER FUNCTIONS

Refer to Figure 3 on page 4 for control locations.



EMERGENCY STOP

At any time during operation, press the Emergency Stop button to stop all functions in an emergency.



SERVICE HORN

At any time during operation, press the Service Horn button to sound an audible warning if necessary.



STARTING THE ENGINE

FROM THE LOWER CONTROLS

1. Turn platform controls key to the ON position.
 - Diesel: wait for the Glow Plug light to go off.
2. Turn the chassis controls key switch to the left (CHASSIS) position.
3. Press the Start button to crank the engine. Release when the engine starts.

FROM THE PLATFORM CONTROLS

1. Turn the chassis controls key switch to the right (PLATFORM) position.
2. Turn platform controls key to the ON position.
 - Diesel: wait for the Glow Plug light to go off.
3. Turn the platform lever switch fully clockwise to crank the engine. Release when the engine starts.



DRIVING

WITH BOOM LOWERED

1. Turn the chassis key switch to PLATFORM, and turn on (turn clockwise) the chassis Emergency Stop switch.
2. Mount the platform, close and latch the gate.
3. Attach an approved fall restraint to the designated platform anchorage point. Attach only one fall restraint to each point.
4. Start the engine.
5. Check that the area around and above the work platform is clear of obstructions, holes, drop-offs, persons in the route of travel, and that the surface is capable of supporting wheel loads.
6. Depress the foot switch and move the drive control handle forward to travel forward and reverse to travel in the reverse direction.

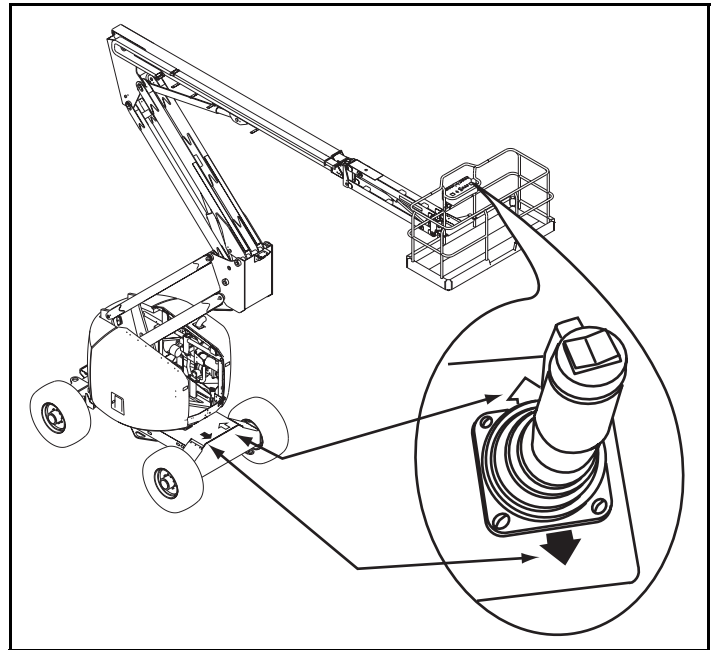
NOTE: When the boom is rotated to the front of the chassis (steering wheels aft), directions of travel and steering will be reversed. Observe the color-coded arrows on the control panel near the drive control handle and on the chassis. They will indicate the direction of travel when the drive control handle is moved.

WITH BOOM ELEVATED

Travel with the boom elevated is restricted to firm, level surfaces only.

When driving with the boom elevated or extended, the machine will travel at creep speed (0,3 m [1 ft.] per second).

Figure 6: Direction Arrows on Chassis



STEERING

1. Depress the foot switch.
2. Push the steering rocker switch to the left to turn left.
3. Push the steering rocker switch to the right to turn right.

NOTE: Steering is not self-centering. Wheels must be returned to the straight ahead position by operating the steering switch.

NOTE: When the boom is rotated to the front of the chassis (steering wheels aft), directions of travel and steering will be reversed. Observe the color-coded arrows on the control panel near the drive control handle and on the chassis. They will indicate the direction of travel when the drive control handle is moved. Refer to Figure 6 on page 8.

POSITIONING THE PLATFORM

Positioning the platform as close as possible to the work area requires some planning. First, you must survey the work site to find a suitable place to park the machine. This must be a firm, level area as close as possible to the work area. Take into consideration all obstructions on the ground and overhead, and avoid them.

Once you have moved the machine to a firm, level surface as near as possible to the work area, follow the instructions on the following pages to position the platform as close to the work area as possible.

Always, before operating any function, check the area around and overhead for any obstructions or electrical conductors.

WARNING

NEVER exit the platform while the boom is elevated. Keep both feet on the platform floor at all times.

MULTIFUNCTION CONTROLS

The UpRight AB62 employs the use of multifunction controls. This means that the riser or boom extension will function at full speed while simultaneously operating the upper boom, jib, turret, or rotating the platform.

WARNING

If the tilt alarm sounds, lower and retract the boom, then drive the machine to a firm, level surface before elevating.

LOWER CONTROL OPERATION

All boom functions will operate at the speed selected by the upper speed control functions.

NOTE: The Platform Ignition switch must be turned ON in order to operate the lower controls.

1. Turn ON the platform ignition switch.
2. Turn the chassis key switch to the left (chassis).
3. With the engine running, operate the boom control switches to position the platform.
 - If slower operation is desired, move the Function Speed (HI/LOW) switch to the low position (see Figure 3 on page 4).
4. The Hi/Low switch will select between maximum speed and a lower fixed Function Speed, depending on the position of the platform Function Speed control.

UPPER CONTROL OPERATION

1. Turn the chassis key switch to the left (Platform).
2. Turn ON the platform ignition switch.



LEVELING THE PLATFORM

⚠ WARNING ⚠

DO NOT operate the machine if the platform does not maintain level when elevated.

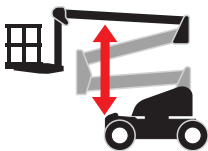
NOTE: Platform leveling should be done only to calibrate the automatic leveling system.

1. Set the Function Speed control dial to the desired setting. Rotate the dial clockwise to increase speed, counterclockwise to decrease. If you are not sure what speed to use, start out slow; the speed can be varied while operating the function.
2. While depressing the foot switch, push the Platform Level control switch forward to swing the platform upward, rearward to swing the platform downward. Release the switch to stop leveling.



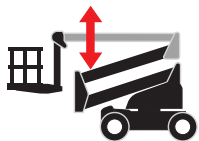
ROTATING THE TURRET

1. Set the Function Speed control dial to the desired setting. Rotate the dial clockwise to increase speed, counterclockwise to decrease. If you are not sure what speed to use, start out slow; the speed can be varied while operating the function.
2. While depressing the footswitch, push the Turret Rotation control lever right to rotate counterclockwise; left to rotate clockwise. Release the switch to stop rotation. Observe the area around the boom when rotating the turret to avoid any obstructions.



ELEVATING THE RISER

1. Set the Function Speed control dial to the desired setting. Rotate the dial clockwise to increase speed, counterclockwise to decrease.
2. While depressing the foot switch, push the Riser control lever forward to elevate the riser, rearward to lower the riser. Release the control lever to stop elevating/lowering.



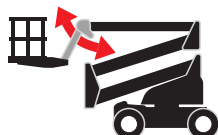
ELEVATING THE UPPER BOOM

1. Set the Function Speed control dial to the desired setting. Rotate the dial clockwise to increase speed, counterclockwise to decrease. If you are not sure what speed to use, start out slow; the speed can be varied while operating the function.
2. While depressing the foot switch, push the upper Boom control lever forward to elevate the upper boom, rearward to lower the upper boom. Release the control lever to stop elevating/lowering.



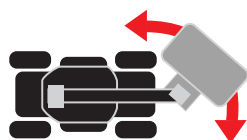
EXTENDING THE UPPER BOOM

1. Set the Function Speed control dial to the desired setting. Rotate the dial clockwise to increase speed, counterclockwise to decrease. If you are not sure what speed to use, start out slow; the speed can be varied while operating the function.
2. While depressing the foot switch, push the Boom Extend control lever rearward to extend the boom, forward to retract the boom. Release the control lever to stop extending/retracting.



ELEVATING THE JIB

1. Set the Function Speed control dial to the desired setting. Rotate the dial clockwise to increase speed, counterclockwise to decrease. If you are not sure what speed to use, start out slow; the speed can be varied while operating the function.
2. While depressing the foot switch, push the Jib control lever forward to elevate the jib, rearward to lower the jib. Release the control lever to stop elevating/lowering.



ROTATING THE PLATFORM

1. While depressing the foot switch, push the Platform Rotate control lever right to go counterclockwise and left to go clockwise. Release the lever to stop rotation.

SWITCHING FUELS (LPG OPTION)

1. With the engine running, turn the fuel selector switch to the opposite position.
 - The engine should continue running on the selected fuel.
2. If the engine stalls, check the following:
 - check the fuel supply in the selected tank.
 - if LPG is selected, make sure that the valve is open on the tanks.
3. Restart the engine.

EMERGENCY OPERATION

In the event of a powered function failure, the elevating assembly may be lowered by using the Auxiliary Power Unit. Hold in the Auxiliary Power button and operate the Lowering Controls as normal.

⚠ WARNING ⚠

NEVER climb down the elevating assembly. If controls do not respond, ask someone on the ground to lower the boom manually.

AFTER USE EACH DAY

1. Ensure that the platform is fully lowered.
2. Park the machine on level ground, preferably under cover
3. Secure against vandals, children or unauthorized operation.
4. Turn the upper key switch to OFF.
5. Turn the lower key switch to the center position (OFF).
6. Remove all keys to prevent unauthorized operation.

TOWING

Perform the following only when the machine will not operate under its own power and it is necessary to move the machine or when winching onto a trailer for transportation

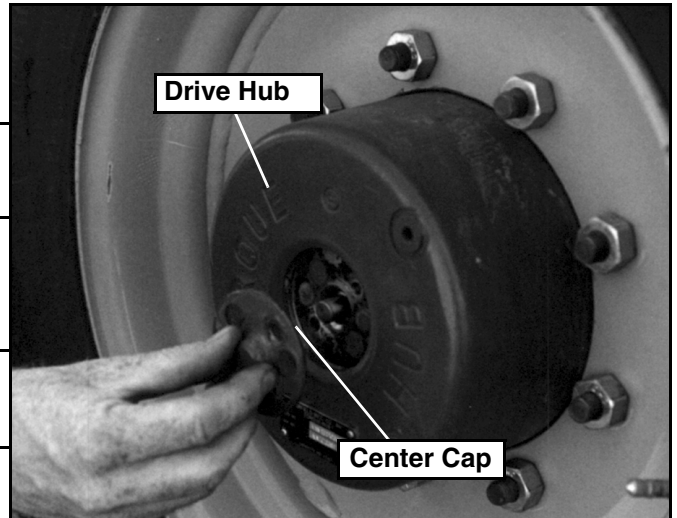
Figure 7: Disengaging Drive Hub

CAUTION

DO NOT move the machine faster than 5 km/h (3 mph). Faster speeds will damage drive components and void warranty.

⚠ WARNING ⚠

Never disengage the hubs unless the wheels are properly chocked and the machine is on a level surface.



1. Chock the wheels.
2. Ensure that the platform is fully lowered, and that the turret is rotated so that the platform is to the rear of the machine.
3. Attach a chain or cable of sufficient strength for towing the machine to the front or rear tie down lugs.
4. Refer to Figure 7 and disengage all four drive hubs. Remove the two screws and center cap. Re-install the center cap in the opposite direction.

NOTE: When hubs are disengaged, the brakes are ineffective. The machine will roll freely.

⚠ WARNING ⚠

Chock the wheels before disengaging the hubs. The machine may roll.

5. When ready to move the machine, remove the chocks. Tow or winch into position and replace the chocks.
6. Engage all four drive hubs by returning the center caps to their original orientation.

TRANSPORTATION

BY CRANE

1. Ensure that the boom is fully lowered and retracted.
2. Ensure that the locking pins are engaged (refer to Figure 4 on page 5).
3. Attach straps to the Chassis Lifting lugs only. Ensure that the straps are adjusted properly to keep the unit level when lifting.

BY TRUCK OR TRAILER

1. Ensure that the boom is fully lowered and retracted.
2. Ensure that the locking pins are engaged (refer to Figure 4 on page 5).

DRIVE ONTO TRANSPORT VEHICLE

1. Raise the jib before the machine starts up or down the ramp to avoid the platform contacting ground.
2. Maneuver the machine onto the bed of the truck/trailer.

WINCH ONTO TRANSPORT VEHICLE

1. When winching, follow instructions for "Towing" on page 12. Attach the winch cable to the front tie down lugs.

CAUTION

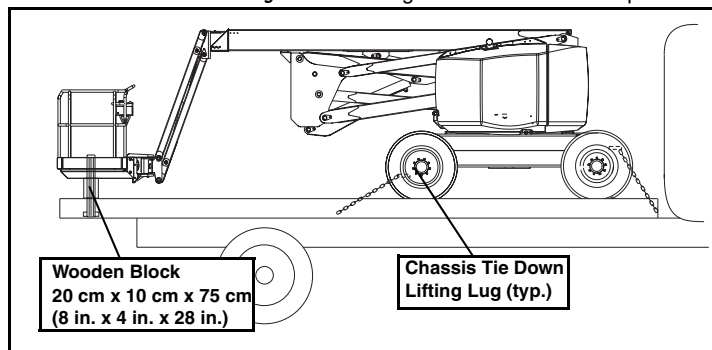
Do not winch the machine faster than 5 km/h (3 mph). Faster speeds will damage drive components and void warranty.

2. After winching, ensure that the wheels are chocked.

SECURE TO TRANSPORT VEHICLE

1. Secure the machine to the transport vehicle using chains or straps of adequate load capacity attached to chassis tie down lugs (refer to "Specifications" on page 20).
2. Place a wooden block, 20 cm x 10 cm x 75 cm (7.5 in. x 4 in. x 28 in.), under the platform support braces as shown.
3. Attach a ratchet strap under the platform floor grating, and over the support braces. Tighten securely; do not over-tighten.

Figure 8: Securing the Machine for Transportation



WARNING

NEVER elevate the machine while on a truck or trailer.

DAILY MAINTENANCE

FUELING

Stop the engine and turn off the key switch before re-fueling.

GASOLINE

1. Open the left turret cover, then open the fill cap.
2. Fill to capacity with unleaded gasoline only.
 - Fuel tank full capacity is 159 liters (42 US gallons).
3. Install the cap.

DIESEL

1. Open the left turret cover, then open the fill cap.
2. Fill to capacity with diesel motor fuel only, grade #1-D or #2-D. Use distillate fuel only; do not use residual or blend.
 - Fuel tank full capacity is 159 liters (42 US gallons).
3. Install the cap.



Figure 9: Fuel Tank

LPG (OPTION)

1. Unfasten the coupler from the LPG valve on the tanks.
2. Remove the LPG tanks from the machine and fill according to ASME, NFPA and local standards.

IMPORTANT: When using propane, use clean, water free liquid petroleum gas, preferably from a bulk storage tank.

WARNING

If you smell propane, close the supply valve on both tanks immediately until you have located and corrected the leak.

HYDRAULIC FLUID

1. Open the turret cover and check the fluid level at the sight gauge with the boom stowed and retracted; engine running or stopped.

NOTE: Never add hydraulic fluid if the boom is elevated or extended.

2. If necessary, fill to capacity with clean ISO compatible hydraulic fluid.
 - Normal Temperature, above 0° C (32° F) __ ISO #46.
 - Low Temperature, below 0° C (32° F) ____ ISO #32.
 - Extreme Temperature, below -17° C (0° F) ISO #15.
3. Clean the area around the cap before opening.
4. Open the filler/breather cap to add hydraulic fluid.
5. Install the cap.

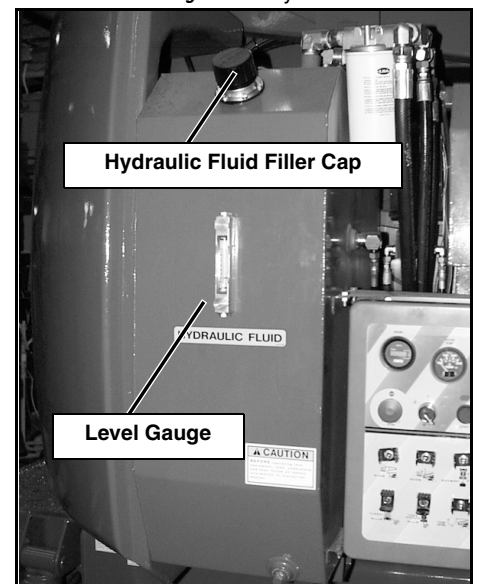


Figure 10: Hydraulic Fluid Tank

BATTERY MAINTENANCE

W A R N I N G

Hazard of explosive gas mixture. Keep sparks, flame, and smoking material away from battery.

Always wear safety glasses when working with batteries.

Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.

*Always replace batteries with UpRight batteries or manufacturer approved replacements weighing ≥ 28 kg (**62 lbs.**) each.*

Check battery fluid level daily.

If the electrolyte level is lower than 10 mm (**3/8 in.**) above plates, add distilled water **ONLY**. Do not use tap water with high mineral content; it will shorten battery life.

The battery and cables should be inspected regularly for signs of cracks in the case, electrolyte leakage and corrosion of the terminals. Inspect the cables for worn spots or breaks in the insulation and for broken cable terminals.

Refer to the Service Manual to extend battery life and for complete service instructions.

TIRES

Tire selection can affect the stability of the machine. Use only tires supplied by the manufacturer unless approved by the UpRight in writing.

Check air filled tire pressure daily. Inflate to 5,5 bar (**80 psi**).

Optional poly-filled tires do not require air pressure.

INSPECTION AND MAINTENANCE SCHEDULE

The complete inspection consists of visual and operational checks, together with all necessary minor adjustments to assure proper performance. Daily inspection will prevent abnormal wear and prolong the life of all systems.

A thorough inspection and maintenance shall be performed by personnel who are trained and familiar with mechanical and electrical procedures at regular intervals. Refer to the Service Manual for the Preventative Maintenance Check List.

Please photocopy the Daily Preventative Maintenance Check List and use the table as a checklist when inspecting the machine for service.

DAILY PREVENTATIVE MAINTENANCE CHECK LIST

MAINTENANCE TABLE KEY

Y = Yes/Acceptable

N = No/Not Acceptable

R = Repaired/Acceptable

PREVENTATIVE MAINTENANCE REPORT

Date: _____

Owner: _____

Model No: _____

Serial No: _____

Serviced By: _____

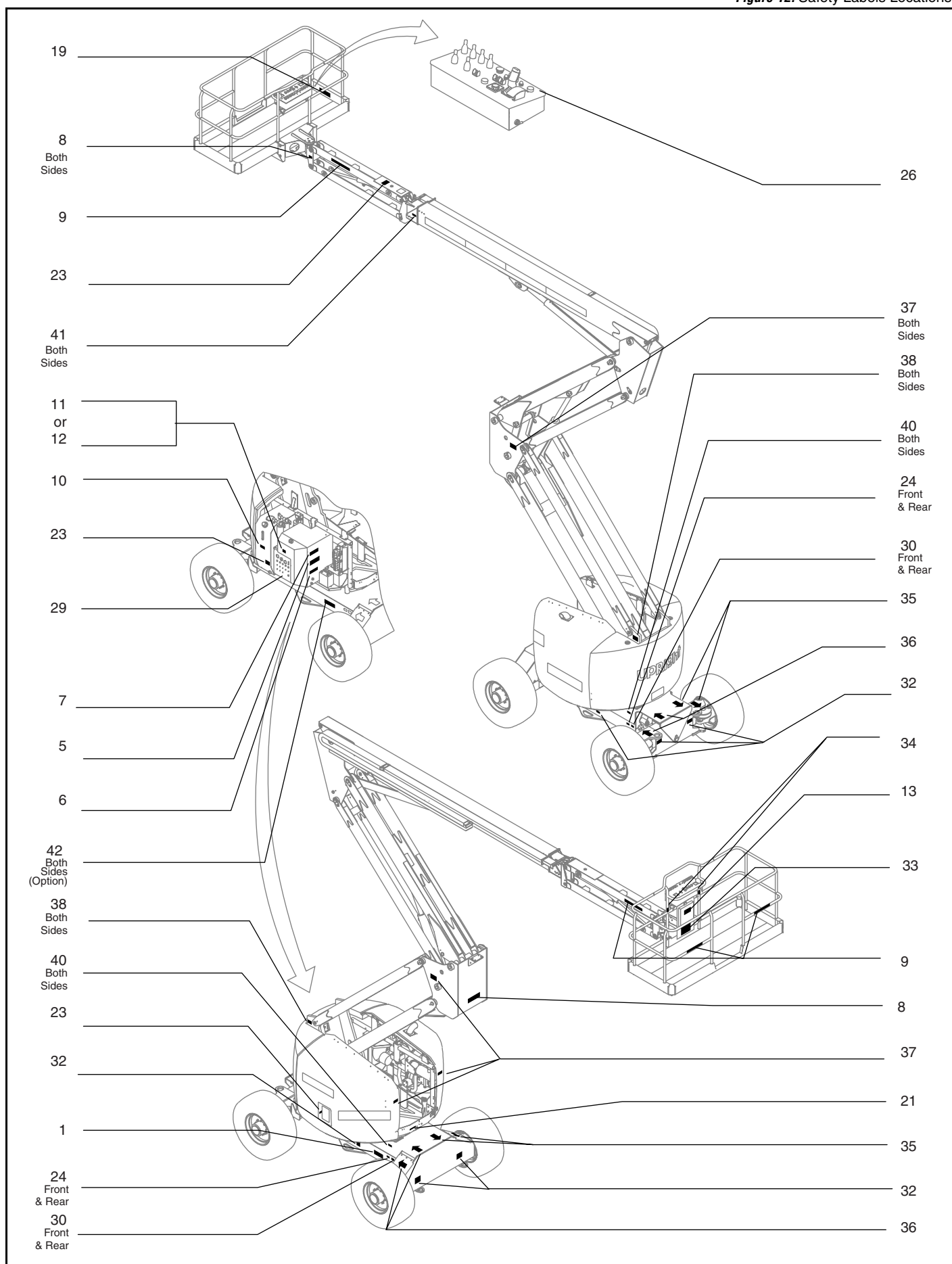
COMPONENT	INSPECTION OR SERVICES	Y	N	R
Battery	Check electrolyte level			
Engine Oil and Filter	Check level and condition			
	Check for leaks			
Engine Fuel System	Check fuel level			
	Check for leaks			
	Check air cleaner			
Engine Coolant	Check coolant level (with engine cold)			
Hydraulic Fluid	Check fluid level			
Hydraulic System	Check for leaks			
Emergency Hydraulic System	Operate the emergency lowering valve and check for serviceability			
Controller	Check operation of all controls			
Control Cable	Check the exterior of the cable for pinching, binding or wear			
Platform Floor and Rails	Check fasteners for proper torque			
	Check welds for cracks			
	Check condition of platform			
	Check condition of anchorage points			
	Check condition of operator manual			

COMPONENT	INSPECTION OR SERVICES	Y	N	R
Tires	Check for damage			
	Check air pressure (5,5 bar [80 psi])			
Hydraulic Pump	Check for hose fitting leaks			
Hydraulic Drive System	Check hydraulic drive motor operation			
	Check hoses, fittings, and valve block for leaks			
Torque Hubs	Check for leaks			
Steering System	Check for missing/loose retainers			
Elevating Assembly	Inspect for structural cracks			
	Check members for deformation			
Chassis	Check hoses for pinch or rubbing points			
	Check welds for cracks			
Turret	Check ring gear for proper lubrication and wear			
Entire Unit	Check for and repair collision damage			
Labels	Check for peeling, missing, or unreadable labels & replace			

Figure 11: Safety Labels

104044-001 AB62 Work Platform - Operator Manual

Figure 12: Safety Labels Locations



SPECIFICATIONS

Specifications are subject to change without notice. Hot weather or heavy use may affect performance.

ITEM	Specification	Reach Envelope Diagram
Height		
Working Height	20,7 m [68 ft.]	
Max. Platform Height	18,9 m [62 ft.]	
Platform step in Height	343 mm [13.5 in.]	
Up and Over Height	9,1m [30 ft.]	
Drivable Height	18,9 m [62 ft.]	
Horizontal Outreach	10,7 m [35 ft.]	
Turret Rotation	360° Continuous	
Platform Rotation	180°	
Tail Swing	0	
Jib Length	1,9 m [6ft. 4 in.]	
Jib Arc	140°	
Inside Turning Radius	2,5 m [8 ft.]	
Outside Turning Radius	5,5 m [18 ft.]	
Drive Speed (boom stowed and lowered)	HIGH 6,8 km/h [4.25 mph] LOW 2,6 km/h [1.6 mph]	
Drive Speed (Elevated)	0,96 km/h [0.6 mph]	
Maximum Gradeability	22° [40%]	
Dimensions (boom stowed)		
Platform Size, Standard 1,8 m [6 ft.]	1 m x 1,8 m [39 in. x 72 in.]	
Platform Size, Optional 2,4 m [8 ft.]	1 m x 2,4 m [39 in. x 96 in.]	
Guardrails	1,4 m [45 in.]	
Toeboard	152 mm [6 in.]	
Platform Capacity (Maximum)	227 kg [500 lbs.]	
Occupants (Maximum)	2	
Weight	10,614 kg [23,400 lbs.]	
Overall Height	2,5 m [8 ft. 2 in.]	
Overall Length	8,2 m or 7,2 m Minimum [27 ft. or 23 ft. 6 in. Minimum]	
Overall Width	2,3 m [7 ft. 7.5 in.]	
Wheel Base	2,3 m [8 ft. 6 in.]	
Ground Clearance	CENTER 0,46 m [18 in.] AXLE 0,32 m [12.5 in.]	
Power Source		
Dual Fuel	GM 3.0 L – 83 HP	
Diesel	Perkins 704-30 – 63 HP	
System Voltage	12 VDC	
Maximum Hydraulic Pressure	345 bar [5000 PSI]	
Controls	Electric Proportional	
Tires		
Size	19 x 15 NHS - 14 PLY	
Pressure	5,5 bar [80 PSI]	

GENERAL INFORMATION

This section contains generic instructions for the repair and maintenance of UpRight Aerial Work Platforms. Referring to the Operator Manual will aid in understanding the operation and function of the various components and systems of the machine, and help in diagnosing and repair of the machine.

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1-1 HAZARD INDICATORS



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates a potentially hazardous situation which, if not avoided, may result in damage to the machine.

1-2 WORKSHOP PROCEDURES

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. Please note that this manual does contain warnings and cautions against some specific service methods which could cause personal injury, or could damage a machine or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by UpRight, Inc., might be done, or of the possible hazardous consequences of each conceivable way, nor could UpRight Inc. investigate all such ways. Anyone using service procedures or tools, whether or not recommended by UpRight Inc., must satisfy themselves thoroughly that neither personal safety nor machine safety will be jeopardized.



Be sure to read, understand and follow all safety rules, operating instructions, and the Scaffold Industry Association's MANUAL OF RESPONSIBILITIES of ANSI A92.6-1999 before performing maintenance on or operating any UpRight Aerial Work Platform.



Never perform service on the machine in the elevating assembly area while platform is elevated without first blocking the elevating assembly.
DO NOT stand in elevating assembly area while deploying or storing brace.
Refer to the Operator Manual for elevating assembly blocking instructions.

1-3 TORQUE SPECIFICATIONS

HYDRAULIC COMPONENTS

NOTE: Always lubricate threads with clean hydraulic fluid prior to installation

Use the following values to torque hydraulic components used on UpRight Aerial Work Platforms.

Table 1-1: Torque Specifications for Hydraulic Components

Type: SAE Port Series	Cartridge Poppet		Fittings		Hoses	
	Ft/Lbs	Nm	Ft/Lbs	Nm	In/Lbs	Nm
#4	N/A	N/A	N/A	N/A	135-145	15-16
#6	N/A	N/A	10-20	14-27	215-245	24-28
#8	25-30	34-41	25-30	34-41	430-470	49-53
#10	35-40	47-54	35-40	47-54	680-750	77-85
#12	85-90	115-122	85-90	115-122	950-1050	107-119
#16	130-140	176-190	130-140	176-190	1300-1368	147-155

FASTENERS

This standard applies to the preloading of fasteners measured by installation torque.

NOTE: For other preloading methods or fasteners consult UpRight Engineering Department.

This general standard applies to all SAE and Metric fasteners unless otherwise specified.

THREAD CONDITION

- For lubricated or zinc plated fasteners use $K = .15$
- For dry unplated fasteners use $K = .20$

TORQUE TABLES

Table 1-2: Torque Specifications for SAE Fasteners





		 SAE J429 Grade 5			 SAE J429 Grade 8		
Nominal Thread Size		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
			K=,15	K=,20		K=,15	K=,20
		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
Unified Coarse Thread Series	1/4 -20	2,000	75	100	2850	107	143
	5/16 - 18	3,350	157	210	4700	220	305
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-16	4,950	23	31	6950	32.5	44
	7/16-14	6,800	37	50	9600	53	70
	1/2-13	9,050	57	75	12800	80	107
	9/16-12	11,600	82	109	16400	115	154
	5/8-11	14,500	113	151	20300	159	211
	3/4-10	21,300	200	266	30100	282	376
	7/8-9	29,435	321	430	41550	454	606
	1-8	38,600	483	640	54540	680	900
		 SAE J429 Grade 5			 SAE J429 Grade 8		
Nominal Thread Size		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
			K=,15	K=,20		K=,15	K=,20
		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
Unified Fine Thread Series	1/4 -28	2,300	85	115	3250	120	163
	5/16-24	3,700	173	230	5200	245	325
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-24	5,600	26	35	7900	37	50
	7/16-20	7,550	42	55	10700	59	78
	1/2-20	10,200	64	85	14400	90	120
	9/16-18	13,000	92	122	18300	129	172
	5/8-18	16,300	128	170	23000	180	240
	3/4-16	23,800	223	298	33600	315	420
	7/8-14	32,480	355	473	45855	500	668
	1-12	42,270	528	704	59670	745	995

Table 1-3: Torque Specifications for Metric Fasteners, U.S. Customary Units

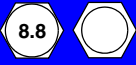
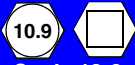

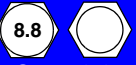
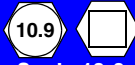

Nominal Thread Size	 Grade 8.8			 Grade 10.9			 Grade 12.9		
	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K =,15	K =,20		K =,15	K =,20		K =,15	K =,20
mm	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
3	-	-	-	-	-	-	823	14.6	19.5
3.5	-	-	-	-	-	-	1,109	22.9	30.5
4	-	-	-	-	-	-	1,436	33.9	45.2
5	1,389	41.0	54.7	1,987	58.7	78.2	2,322	68.6	91.2
6	1,966	69.7	92.9	2,813	100.0	132.8	3,287	116.8	155.8
7	2,826	116.8	155.8	4,044	167.3	223.0	4,727	195.6	260.2
		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.
8	3,579	14.1	18.8	5,122	20.1	26.9	5,986	23.6	31.4
10	11,742	27.9	37.2	8,117	39.9	53.3	9,486	46.7	62.3
12	8,244	48.7	64.9	11,797	69.7	92.2	13,787	81.1	108.4
14	11,246	77.4	103.3	16,093	110.6	147.5	18,808	129.1	172.6
16	15,883	125.4	166.7	21,971	173.3	230.9	25,677	202.1	269.2
18	19,424	171.9	229.4	26,869	238.2	317.2	31,401	278.1	371.0
20	2,304	243.4	325.3	34,286	337.8	449.9	40,070	394.6	525.9
22	30,653	331.9	442.5	42,403	458.8	612.2	49,556	536.2	715.4
24	35,711	420.4	562.0	49,400	583.4	778.1	57,733	682.2	909.4
27	46,435	617.3	84.8	64,235	853.4	1138.1	75,069	997.2	1329.8
30	56,753	837.9	1117.4	78,509	1159.4	1545.2	91,751	1354.9	1807.0
33	70,208	1140.3	1520.1	97,121	1576.9	2102.8	113,503	1843.9	2457.5
36	82,651	1464.1	1952.3	114,334	2025.3	2700.9	133,620	2367.6	3156.0

Table 1-4: Torque Specifications for Metric Fasteners, SI Units

Nominal Thread Size	 Grade 8.8			 Grade 10.9			 Grade 12.9		
	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K =,15	K =,20		K =,15	K =,20		K =,15	K =,20
mm	N	N-m	N-m	N	N-m	N-m	N	N-m	N-m
3	-	-	-	-	-	-	3660	1,65	2,2
3,5	-	-	-	-	-	-	4932	2,59	3,45
4	-	-	-	-	-	-	6387	3,83	5,11
5	6177	4,63	6,18	8840	6,63	8,84	10330	7,75	10,3
6	8743	7,87	10,5	12512	11,3	15	14623	13,2	17,6
7	12570	13,2	17,6	17990	18,9	25,2	21025	22,1	29,4
8	15921	19,1	25,5	22784	27,3	36,5	26626	32	42,6
10	52230	37,8	50,5	36105	54,1	72,2	42195	63,3	84,4
12	36670	66	88	52475	94,5	125	61328	110	147
14	50025	105	140	71587	150	200	83663	175	234
16	70650	170	226	97732	235	313	114218	274	365
18	86400	233	311	119520	323	430	139680	377	503
20	10250	330	441	152513	458	610	178238	535	713
22	136350	450	600	188618	622	830	220433	727	970
24	158850	570	762	219743	791	1055	256808	925	1233
27	206550	837	115	285728	1157	1543	333923	1352	1803
30	252450	1136	1515	349223	1572	2095	408128	1837	2450
33	312300	1546	2061	432015	2138	2851	504885	2500	3332
36	367650	1985	2647	508582	2746	3662	594368	3210	4279

1-4 DATE CODE IDENTIFICATION ON HOSES

GATES uses an eight digit code: Plant, Month, Day, Year.
i.e.: XX 01 07 01 - means Plant XX January 07 2001.

PARKER uses a 4 digit code indicating Quarter and Year.
i.e.: 2Q01 - means Second Quarter of 2001.

DAYCO stamps month, day and year on each hose.

1-5 SPECIAL TOOLS

The following is a list of special tools which may be required to perform certain maintenance procedures on the machine.

- 0-69 bar (**0-1000 psi**) Hydraulic Pressure Gauge with Adapter Fittings
- 0-207 bar (**0-3000 psi**) Hydraulic Pressure Gauge with Adapter Fittings
- 0-414 bar (**0-6000 psi**) Hydraulic Pressure Gauge with Adapter Fittings
- Small UpRight Connector Field Kit (UpRight P/N 030899-000)
- Large UpRight Connector Field Kit (UpRight P/N 030898-000)
- Inclinator (UpRight P/N 010199-000-00)
- MOS90 Calibrator (UpRight P/N 057128-000)
- Optimizer with adapter (UpRight P/N 100329-000)
- Flow Meter Kit (UpRight P/N 067040-000)
- Quadragauge with fitting (UpRight P/N 063971-000)
- 0-25 kg (**0-50 Lbs.**) Chain Tension Scale (UpRight P/N 107078-000)

UPRIGHT LIFT TOOL LIST

- Gland Nut Wrench (UpRight P/N 062521-000)
- Strap Wrench (UpRight P/N 062482-000)
- Tierod Tensioner (2 required) (UpRight P/N 062738-000)
- Tensioner Bracket (2 required) (UpRight P/N 062739-000)

1-6 UPRIGHT CONNECTORS

UpRight connectors are designed so that connector parts, contacts or electrical cables may be replaced without replacing the entire connector.

Figure 1-1: UpRight Connector Kits



Small Kit

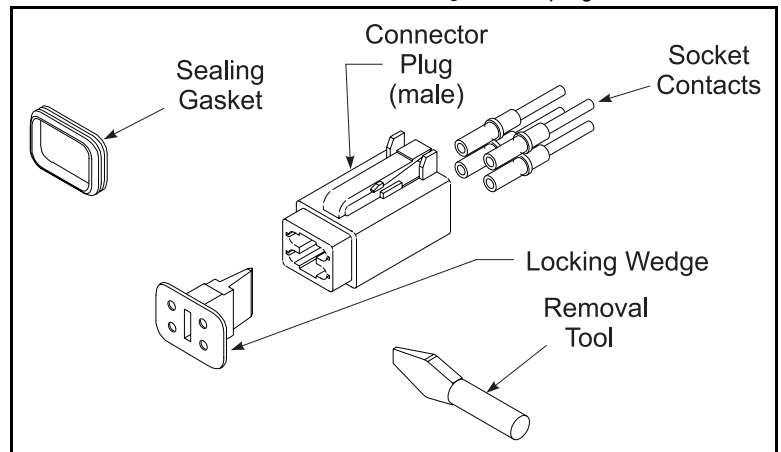


Large Kit

MALE CONNECTOR (PLUG)

1. Disconnect the male connector (plug) from the female connector (receptacle).
2. Using the flat end of the Removal Tool (or flat blade screwdriver), pry the Locking Wedge from the Male Connector. Care should be taken that the Sealing Gasket is not damaged during this procedure.
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or re-crimp the wires and contacts. Refer to "Crimping" procedure.

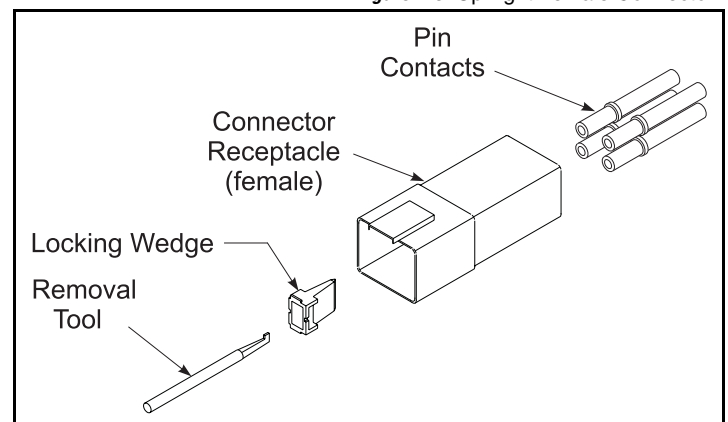
Figure 1-2: UpRight Male Connector



FEMALE CONNECTOR (RECEPTACLE)

1. Disconnect the male connector (plug) from the female connector (receptacle).
2. Using the notched end of the Removal Tool (or a wire hook), pull the Locking Wedge from the Female Connector.
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or re-crimp the wires and contacts. Refer to "Crimping" procedure.

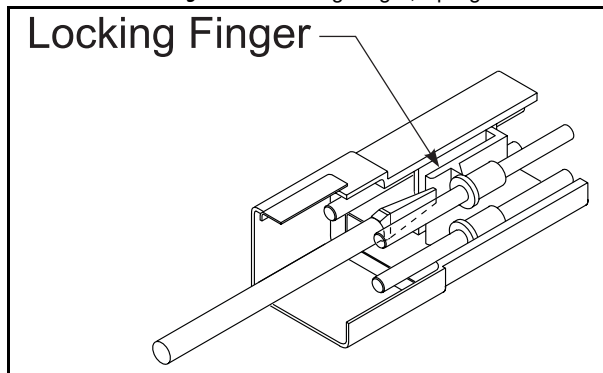
Figure 1-3: UpRight Female Connector



RELEASING LOCKING FINGERS

1. The Locking Fingers can be released following the removal of the Locking Wedge of either the male or female connector.
2. Use the removal tool (or flat bladed screwdriver) to push the Locking Fingers aside. This will release the grip on the contact.
3. Pull the wire and contact out of the connector.

Figure 1-4: Locking Finger, UpRight Connector



CRIMPING

1. Strip 6 mm ($\frac{1}{4}$ in.) from the wire.

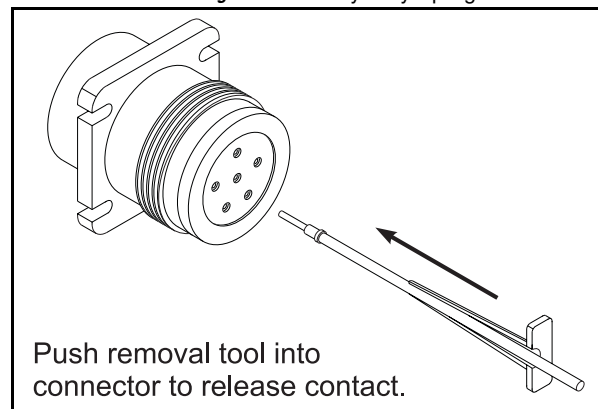
NOTE: Complete crimping instructions are included in each Field Kit.

2. Insert the contact into the crimping tool.
3. Insert the stripped wire into the contact. Copper strands should be visible in the bleed hole of the contact and no copper strands should be loose (outside) of the contact barrel.
4. Completely close the handles of the crimping tool. Release the handles of the crimping tool and remove the crimped contact.
5. Inspect the crimped contact to ensure that all strands are secure in the crimp barrel.

REMOVING CONTACT FROM HEAVY DUTY PLUG

Figure 1-5: Heavy Duty UpRight Connector

1. Slip the removal tool along the wire to be replaced.
2. Push the removal tool into the connector until the contact is released.
3. Pull the wire and contact out of the plug.



1-7 HYDRAULIC MANIFOLD REPAIR

REMOVAL

Refer to the *Service and Repair* section for model specific information.

1. Disconnect the battery.
2. Tag and disconnect the solenoid valve leads.
3. Tag, disconnect, and plug hydraulic hoses.
4. Remove the bolts that hold the manifold to the mounting bracket.
5. Remove the manifold block.

DISASSEMBLY

NOTE: Mark all components as they are removed so as not to confuse their location during assembly.

1. Remove coils from solenoid valves.
2. Remove valves.
3. Remove fittings, plugs, springs, balls, and orifices.

CLEANING AND INSPECTION

1. Wash the manifold in cleaning solvent to remove built-up contaminants, then blow out all passages with clean compressed air.
2. Inspect the manifold for cracks, thread damage and scoring where O-rings seal against internal and external surfaces.
3. Wash and dry each component and check for thread damage, torn or cracked O-rings, and proper operation.
4. Replace parts and O-rings found unserviceable.

ASSEMBLY

Refer to the *Service and Repair* section for assembly drawings, and the *Parts Manual* for illustrated parts breakdowns.

NOTE: Lubricate all O-rings before installation to prevent damage to O-rings. Seat all balls in manifold block by lightly tapping on the ball with a brass drift punch.

1. Install fittings, plugs, springs, balls, and orifices. Use one drop of Loctite #242 on each screw-in orifice.
2. Install valves.

INSTALLATION

Refer to the *Service and Repair* section for model specific information.

1. Attach manifold assembly to mounting plate with bolts.
2. Connect solenoid leads (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to manifold.
4. Reconnect the battery.
5. Operate each hydraulic function and check for proper operation and leaks.
6. Adjust valve pressures according to the *Service and Repair* section.

1-8 CYLINDER REPAIR

⚠ WARNING ⚠

Cylinders may be very heavy. Support heavy cylinders before removing pins which secure the cylinder to the machine.

REMOVAL

NOTE: Refer to the *Service and Repair* section for the location of cylinders, and the *Parts Manual* for a list of parts which secure the cylinders.

1. Mark and disconnect hoses and IMMEDIATELY cap the openings to prevent contamination.
2. Remove the cylinder from the machine as described in the *Service and Repair* section.

DISASSEMBLY

1. Remove the head from the cylinder body.
2. Carefully slide the rod assembly out of the cylinder.
3. Remove the seal kit components (wipers, rod seals, o-rings and backup rings) from the head and piston.
4. Inspect parts for scratches, pits or polishing. Check seal grooves and sealing surfaces. Scratches or pits deep enough to catch the fingernail are unacceptable; replace the cylinder. Polishing is a sign of uneven loading. When this occurs, the surface should be checked for roundness. Cylinders not round within 0,18 mm (.007 in.) should be replaced.

ASSEMBLY

Refer to the *Service and Repair* section for seal-kit assembly drawings, and the *Parts Manual* for illustrated parts breakdowns.

NOTE:

- To avoid cutting the seals, do not use sharp edged tools during seal replacement. After installing seals allow at least one hour for the seals to elastically restore to their original shape before assembling the cylinder.
- Torque all hardware to torques according to Table 1-1, "Torque Specifications for Hydraulic Components," on Page 1-3 unless otherwise specified.

1. Lubricate all components with clean hydraulic fluid.
2. Install new seal kit components.
3. Lubricate the rod wiper and seal with hydraulic fluid and slide the head onto the rod.
4. Lubricate the seals on the piston and head.
5. Carefully slide the rod assembly into the cylinder.
6. Secure the head into the cylinder.

INSTALLATION

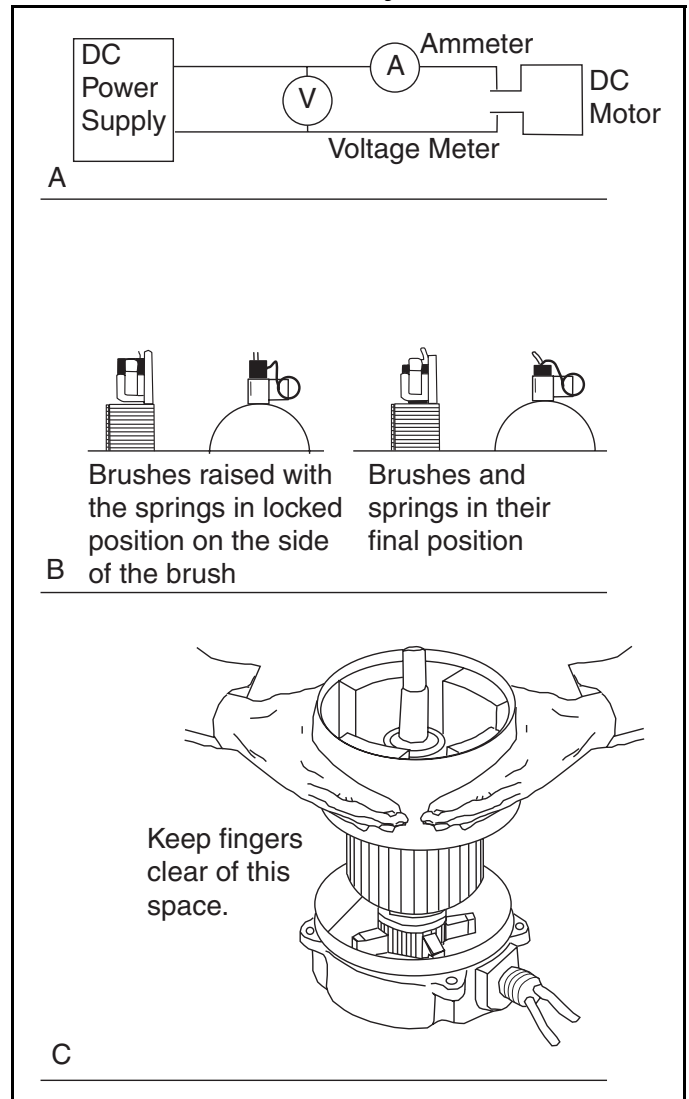
1. Installation is reverse of removal.
2. Carefully remove the elevating assembly support.
3. Slowly cycle the cylinder several times to remove air from the hydraulic system.
4. Check for proper cylinder operation. Check hydraulic connections for leaks.

1-9 ELECTRIC MOTORS

TROUBLESHOOTING

1. Read the nameplate to become familiar with the motor, especially the rated voltage.
2. Try to turn the shaft by hand. Keep motor leads separated while doing this. If the shaft turns freely go to Step 3. If the shaft won't turn, proceed to Step A.
- A. The shaft could be tight for a number of reasons, this check is to determine if the tightness is of a temporary nature only.
 - a. Obtain power to produce the nameplate voltage. **Do not Make a Permanent Connection.**
 - b. First touch the motor leads quickly to the power supply just long enough to observe if the shaft turns.
 - c. If it does turn, then hold the motor leads on the power supply for a longer time. If the motor sounds normal, go to Step 3..
 - d. If the motor sounds noisy, it should be taken apart as described in the disassembly section.
3. If the motor turned freely, connect an ammeter in the circuit as shown in Figure 1-6A. With rated voltage applied and the shaft running free, the ammeter should read less than 20% of the nameplate full load current. If the motor meets the above conditions, then it can be assumed that the original problem is external to the motor.

Figure 1-6: Electric Motor Service



DISASSEMBLY

1. Remove the through bolts.
2. Remove the pulley end cover.
3. Pull the armature out of the assembly in one swift motion.
4. Remove the commutator end cover.

NOTE: Do not place the stator ring in any mechanical holding device during the disassembly or assembly operation. Permanent distortion or other damage will result.

INSPECTION

Once the motor has been disassembled, go through the following check-list steps to determine where the problem lies.

1. Bearings should spin smoothly and easily and have ample lubrication and be free of corrosion.
2. The armature should be checked for grounds and shorted turns. Re-finish the commutator surface if it is pitted or excessively worn. (This procedure should be performed by a qualified electric motor shop.)
3. Brushes should be checked for wear and to ensure that they are free in the brush holders.

NOTE: Observe how the brushes are assembled in the brush holders, and the position of the brush lead. New brushes must be installed in the same manner. Brushes should be removed as follows:

- a. Remove the brush spring clip from its mounting on the brush assembly.
 - b. Lift the brush assembly from the brush holder.
 - c. Disconnect the brush assembly lead.
 - d. Install the new brush assembly by reversing the above procedure.
4. Inspect the wire harness and all connections for signs of damage due to overheating.
 5. Check the stator to see if it is securely mounted.

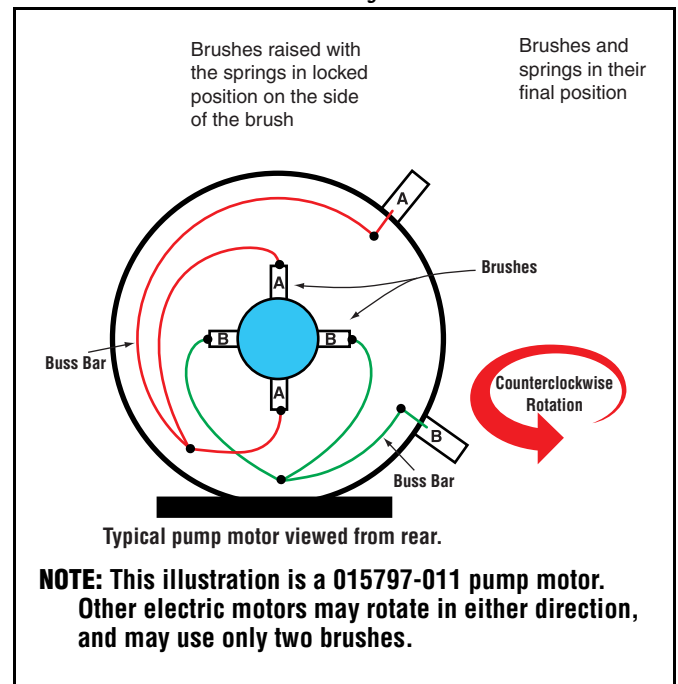
REASSEMBLY

1. Install new brushes and be sure they are free in the holder. Install the brush with the lead wires positioned as when received. Raise all brushes to the locked position. (See Figure 1-7 and **Inspection** Step 3.).
2. Place the commutator cover on a work bench with the brush assembly facing upward.
3. Place the bearing spring into the bearing bore.
4. Take a complete armature assembly, including bearings, and insert the commutator end bearing into the bearing bore.

NOTE: Do not re-use bearings which have been removed from the armature shaft. Keep the assembly in a vertical position. Use extreme care not to damage the armature with bearing pullers. New bearings should be installed by pressing the inner race of the bearing onto proper position on the armature shaft.

5. Set the brushes into their final position as shown in Figure 1-7.
6. Place the complete stator down over the vertical armature, and into position on the commutator cover.
7. The stator assembly must be placed in a definite relationship with the commutator covers in order to obtain a neutral brush setting. There is a match-mark on both items. These two marks must line up exactly. Rotate until they do.
8. Assemble the pulley end cover in the proper relationship. Insert the mounting bolts and tighten alternately to ensure a good mechanical alignment.
9. Spin the shaft by hand to see if it is free. Be sure motor leads (if used) are not touching together. If the leads are touching, a generator action will give the effect of friction in the motor. A no-load test can now be performed. At the rated voltage, observe the no-load current. It should be less than 20% of the name-plate full load current. Anything higher indicates:
 - Brushes are not on neutral setting (check match-marks for exact alignment).
 - Faulty armature.

Figure 1-7: Electric Motor Brushes



1-10 BATTERY MAINTENANCE

CAUTION

If battery water level is not maintained, batteries will not fully charge, creating a low discharge rate.

WARNING

Hazard of explosive gas mixture. Keep sparks, flame and smoking materials away from batteries.

Always wear safety glasses when working with batteries.

Battery fluid is highly corrosive. Thoroughly rinse away any spilled fluid with clean water.

Always replace batteries with UpRight batteries or manufacturer approved replacements.

Before disconnecting the battery negative (-) lead, make sure all switches are OFF. If ON, a spark will occur at the ground terminal which could cause an explosion if hydrogen gas or fuel vapors are present.

- Check battery fluid level daily.
- If electrolyte level is lower than 10 mm (**3/8 in.**) above plates, add distilled water only.
DO NOT use tap water with high mineral content. It will shorten battery life.
DO NOT overfill. Battery acid expands during charging and can overflow.
- Keep terminals and tops of batteries clean.
- The battery and cables should be inspected regularly for signs of cracks in the case, electrolyte leakage and corrosion of the terminals. Inspect the cables for worn spots or breaks in the insulation and for broken cable terminals.
- Clean batteries whenever there are signs of corrosion at the terminals, or when electrolyte has overflowed during charging. Use a baking soda solution to clean batteries, taking care not to get the solution inside the cells. Rinse thoroughly with clean water.
- Clean battery and cable contact surfaces to a bright metal finish whenever a cable is removed.

BATTERY CHECK

Electric UpRight Aerial Work Platforms use deep cycle batteries. If poor service life is experienced, batteries should be checked for bad cells. Fully charge batteries for 14 hours minimum, ensuring that the charger has completed its cycle (see 'Battery Charging' on page 1-16).

Deep cycle batteries do not have their full potential until they have been through 50 charge/discharge cycles. Normal 5-day weeks, charging batteries every day, equals 50 cycles in ten weeks.

If bad cells are found in any battery in a battery pack more than two years old, all batteries in the pack should be replaced for balance.

BATTERY CELL EQUALIZATION

The specific gravity of the electrolyte in the battery cells should be equalized monthly. To do this, charge batteries as outlined in 'Battery Charging' on page 1-16. After this initial charge, recheck the electrolyte level in all cells and add distilled water as necessary. Then, turn on the charger for an additional eight hours.

SPECIFIC GRAVITY

Check the specific gravity of all cells with a hydrometer. The temperature corrected specific gravity of a fully charged battery should be 1.260. If any corrected readings are below 1.230, the batteries containing such cells should be replaced.

Do not check the specific gravity in a cell to which water has just been added. If there is not enough electrolyte in a fully charged cell to obtain a sample for the hydrometer, add water and complete a discharge/charge cycle before checking.

Table 1-5: Specific Gravity and Battery Voltage

SPECIFIC GRAVITY		VOLTS DC				
	Each Cell	Per Cell	6V Battery	12V Battery	24V Battery Pack	48V Battery Pack
Fully Charged	1.270	2.10	6.30	12.60	25.20	50.40
Fully Discharged	1.130	1.75	5.25	10.50	21	42

LOAD TESTING BATTERY PACKS

1. Fully charge the battery pack.
2. With the battery pack at rest and under full load, perform steps 3 and 4.
 - a. To put the battery pack under full load,
 - Activate the steering switch to turn the wheels fully in either direction.
 - Continue to hold the steering switch while performing steps 3 and 4.
3. Measure the potential across each battery.
4. Measure the potential across the entire battery pack.
5. Compare the measured results

Any battery that measures 10% lower voltage than the others has a bad cell and should be replaced.

BATTERY CHARGING

CAUTION

Permanent damage will result if the battery is not immediately recharged after discharging.

WARNING

Charge batteries only in a well ventilated area.

DO NOT charge batteries when sparks or open flames are present.

Never leave the connected charger unattended for more than two days.

Never disconnect the cables from the battery when the charger is operating.

Keep the charger dry.



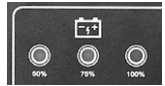
- Charge batteries at the end of each work shift or sooner if the batteries have been discharged.
- Discharging a deep cycle battery to less than 1.75 Volts per cell can cause permanent damage.

NOTE: Do not operate the machine when the battery charger is plugged in.

When night temperatures fall below 65°F (18°C), batteries charged in unheated areas should be charged as soon after use as possible. Under such conditions a four hour charge cycle once a week in the early afternoon will improve the state of charge and battery life.

1. Check the battery fluid level. If electrolyte level is lower than 10 mm (**3/8 in.**) above plates, add distilled water only.
2. Check the charger to determine the AC charging current. If equipped, set the AC voltage selector switch to match the AC power source.
3. Connect an extension cord that meets or exceeds the charger AC current onto the charger plug.
4. Connect the other end of the extension cord to a grounded AC outlet of proper current, voltage and frequency rating.
5. The charger turns on automatically after a short delay. Table 1-6 illustrates charging indicators.

Table 1-6: Battery Charging, UpRight Electric and BiEnergy Machines

Charger Display	AC Charging Current		Charging Indicator	Charger Shutdown
	068574-000	8 Amp - 115 VAC	Ammeter <ul style="list-style-type: none"> • Charging current is displayed on ammeter. • Current drops off as batteries charge. 	<ul style="list-style-type: none"> • Charger shuts off automatically. • Ammeter shows "0" current.
	069112-000	4 Amp - 230 VAC		
	063944-001	7 Amp - 115 VAC	Green Light <ul style="list-style-type: none"> • ON during charging cycle. • Blinking at charge completion. 	<ul style="list-style-type: none"> • Charger automatically shuts down to 1 amp trickle charge. • Green Light continues to blink.
	063948-003	4 Amp - 230 VAC		
	069199-000 & 069199-001 Dual Voltage	8 Amp - 115 VAC 4 Amp - 230 VAC	Three Lights <ul style="list-style-type: none"> • 0 - 50% charge: First Light -Blinking- Second and Third Light -OFF- • 50% - 75% Charge: First Light -ON- Second Light -Blinking- Third Light -OFF- • 75% - 100% Charge: First and Second Light -ON- Third Light - Blinking- • Charge Complete All Lights -ON- 	<ul style="list-style-type: none"> • Charger automatically shuts down to low current after charging is complete and all Lights turn ON. • Charger continues at low current (equalizing charge) for 3-4 hours, then charging current shuts off completely. • Lights remain ON until the AC power supply is disconnected.

BATTERY CHARGER TROUBLESHOOTING

CAUTION

Ensure that battery chargers with voltage selector switches are set on the correct AC line voltage before placing chargers in service to avoid charger failure.

Connect battery leads in correct polarity to avoid charger damage.

WARNING




Remove all power before working on electrical parts to avoid shock.

Shock hazard can exist if AC plugs are wired incorrectly.

The battery charger troubleshooting procedure is outlined in Table 1-7. The table shows various conditions for each charger type with the problem to be investigated. Follow the table from the top down when troubleshooting. If the problem is not resolved after going through the entire table, the charger should be replaced.

NOTE: The majority of chargers returned to UpRight as “failed” test good. Please follow the troubleshooting procedures carefully.

Table 1-7: Battery Charger Troubleshooting

				
Problem	068574-000 (115V) 069112-000 (110/230V)	063944-001 (115V) 063948-003 (110/230V)	069199-000 & 069199-001 (115/230V auto)	Solution
Battery voltage is below 18 Volts (too low to allow the charger to turn on).	<ul style="list-style-type: none"> • Ammeter does not move. • No hum from charger. 	<ul style="list-style-type: none"> • No green Light. • No hum from charger. 	<ul style="list-style-type: none"> • Not Applicable. • Charger turns on even with very low battery voltage. 	Charge batteries to at least 24 Volts with an external charger, then disconnect the external charger and plug in the internal charger.
The charger has been plugged into an AC outlet with different voltage than the AC switch setting on the charger.	<ul style="list-style-type: none"> • Ammeter does not move. • No hum from charger. 	<ul style="list-style-type: none"> • No green Light. • No hum from charger. 	<ul style="list-style-type: none"> • Not Applicable. • Charger automatically adjusts to the incoming AC current. 	063944-001 ONLY <ul style="list-style-type: none"> • Check the fuse inside the switch box - replace if bad. • If the fuse is good, the charger has failed. All Others <ul style="list-style-type: none"> • Check the AC main circuit breaker and reset if necessary. • Set the voltage selector switch to the proper voltage.
Fuse visible on front of charger has failed.	<ul style="list-style-type: none"> • Ammeter does not move. • No hum from charger. 	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • Not Applicable. 	Check for DC output short circuit and replace the fuse.
AC power problem.	<ul style="list-style-type: none"> • Ammeter does not move. • No hum from charger. 	<ul style="list-style-type: none"> • No green Light. • No hum from charger. 	<ul style="list-style-type: none"> • No Lights ON. • No Lights blinking. 	<ul style="list-style-type: none"> • AC outlet is bad. • Extension cord is bad • Plug is bad or wired wrong. • AC wire is broken. Check and repair as necessary.
DC connection to batteries.	<ul style="list-style-type: none"> • Ammeter does not move. • No hum from charger. 	<ul style="list-style-type: none"> • No green Light. • No hum from charger. 	<ul style="list-style-type: none"> • All three Lights blink once. 	Connection to battery; <ul style="list-style-type: none"> • missing. • corroded. • wrong polarity. • DC wire broken. Check and repair as necessary, and check Fuse.
One or more batteries is bad.	<ul style="list-style-type: none"> • Ammeter never shuts off, even after 14 hours of charging. 	<ul style="list-style-type: none"> • Green Light ON but never starts blinking, even after 14 hours of charging. 	<ul style="list-style-type: none"> • Lights one and two are ON or blinking, but all three Lights ON never occurs, even after 14 hours of charging. 	<ul style="list-style-type: none"> • Check water level. • Check for shorted cells. • Replace bad batteries.
AC input voltage too high.	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • All three Lights blink two times. 	Check and correct AC source.
Overheated charger.	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • All three Lights blink three times. 	Move the machine to a cooler area. Allow the machine to cool before connecting to AC source.
High current in DC charging output.	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • Not Applicable. 	<ul style="list-style-type: none"> • All three Lights blink four times. 	<ul style="list-style-type: none"> • Check for shorted DC output wires. • Check for bad batteries.

1-11 FLOOR LOADING

Floor Loading is defined as pressure imposed onto load-bearing surfaces, and can be measured as **Localized Pressure** or **Occupied Pressure**. To calculate Floor Loading, find the Total Weight of the machine.

TOTAL WEIGHT = MACHINE WEIGHT + MAXIMUM PLATFORM CAPACITY.

Refer to the machine specifications or contact UpRight or your UpRight dealer.

LOCALIZED PRESSURE

KG/CM² (PSI)

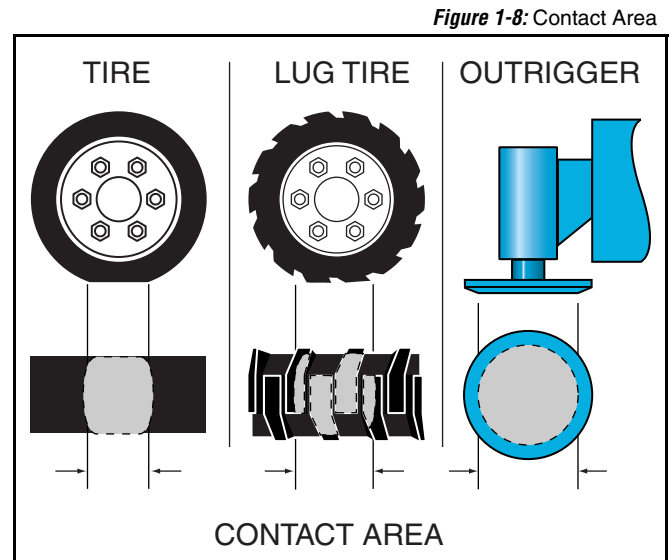
Localized Pressure is measured in *kilograms per square centimeter (pounds per square inch)*. It is the pressure exerted onto a small area (contact area). Each tire and/or outrigger imposes Localized Pressure which can cause damage to the load-bearing surface.

NOTE: The formulas shown here are for vertical lift machines. Applying these formulas to machines with extending platforms will yield average pressures for machines in stowed position. Extending a platform causes increased localized pressure in the direction of extension, and decreased localized pressure at the opposite end.

MEASURE THE CONTACT AREA

Measure the contact area of the contacting surface (tire or outrigger).

The tire contact area can be determined by placing the loaded tire on a clean surface. The tire will leave an imprint from which an area can be determined.



CALCULATE THE LOCALIZED PRESSURE

Find the pressure exerted at each contacting surface.

NOTE: The wheel load can usually be found on a label on the machine, or on the serial plate.

If you know the wheel load, use this formula:

LOCALIZED PRESSURE = WHEEL LOAD ÷ CONTACT AREA

If you do not know the wheel load, use this formula:

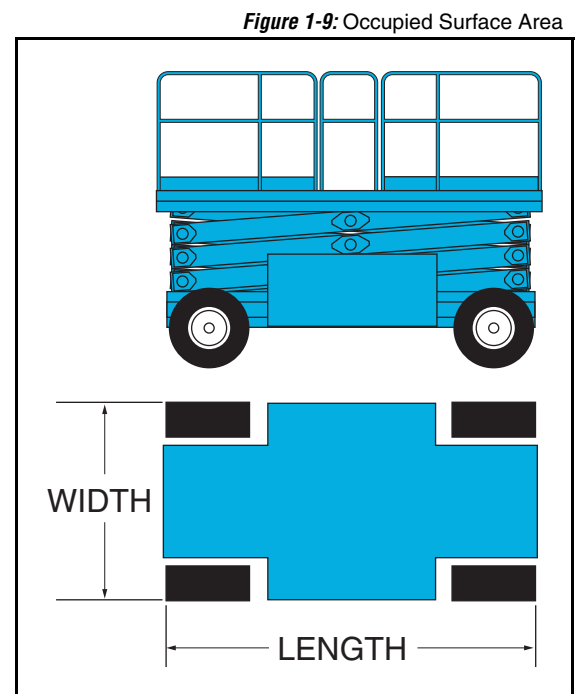
LOCALIZED PRESSURE = (TOTAL WEIGHT ÷ 4) ÷ CONTACT AREA

OCCUPIED PRESSURE

BAR (PSF)

Occupied Pressure is measured in *bar (pounds per square foot)*. It is the total pressure imposed onto the work surface over the area of the machine (occupied surface area). This is especially important when the work surface is supported by beams. The Occupied Pressure *must not exceed* the maximum load that the surface can support.

OCCUPIED PRESSURE = TOTAL WEIGHT ÷ (LENGTH X WIDTH)



1-12 HYDRAULIC FLUID

FLUID LEVEL

With the platform fully lowered, check the hydraulic fluid level. If the fluid is NOT in operating range, add hydraulic fluid until the fluid level is in operating range.

- DO NOT fill above operating range.
- DO NOT add fluid when the platform is elevated.

RECOMMENDED HYDRAULIC FLUID

CAUTION

Unless recommended by UpRight, do not mix hydraulic fluids of different brands or types. The required additives and fluid viscosities may vary.

If the use of hydraulic fluids other than listed below is desired please contact UpRight Product Support.

MOBILFLUID 424

- Viscosity Grade: ISO 46 High V.I. (similar to SAE 10W-30).
- Viscosity index: 152.
- Operating Range: -10° C to +96° C (+15° F to +205° F) Reservoir Temperature.
- Ambient Conditions*: Above -10° C (+15° F).

MOBIL DTE 13 M

- Viscosity Grade: ISO 32 High V.I. (similar to SAE 5W-20).
- Viscosity index: 140.
- Operating Range: -18° C to +80° C (-4° F to +176° F) Reservoir Temperature.
- Ambient Conditions*: -18° C to +30° C (-4° F to +86° F).

MOBIL DTE 11 M

- Viscosity Grade: ISO 15.
- Viscosity index: 140.
- Operating Range: -35° C to +45° C (-30° F to +115° F) Reservoir Temperature.
- Ambient Conditions*: -35° C to +20° C (-30° F to +70° F).

MOBIL EAL ENVIROSYN 46 H

For use where a *biodegradable non-toxic hydraulic fluid is required*.

- Viscosity Grade: ISO 46 High V.I. (similar to SAE 10W-20).
- Viscosity Index: 153.
- Operating Range: -14° C to +90° C (+6° F to +195° F) Reservoir Temperature.
- Ambient Conditions*: -14° C to +41° C (+6° F to +105° F).
- Synthetic Ester Base.

The anti-wear quality of hydraulic fluid must meet or exceed API Service Classification GL-3. The chemical stability of the hydraulic fluid must be sufficient for mobile hydraulic system service.

*Ambient Conditions are for reference only and may vary by model. Refer to operating temperature for final determination of correct fluid.

1-13 LONG TERM STORAGE

NOTE: Do not drain the hydraulic system prior to long term storage.

If the machine is to be placed in long term storage, follow these recommended preservation procedures.

PRESERVATION

1. Clean painted surfaces. If paint is damaged, repaint.
2. Fill the hydraulic reservoir to operating level.

IMPORTANT: Do not fill the hydraulic reservoir while the platform is elevated.

3. Coat exposed portions of cylinder rods with a preservative such as multipurpose grease and wrap with a barrier material.
4. Coat all exposed unpainted metal surfaces with preservative.
5. **Internal Combustion Models:** Service the engine according to the manufacturers recommendations.
6. **Electric And BiEnergy Models:** Remove the batteries and place them in alternative service.

SERVICE AND REPAIR

This section contains instructions for the service and repair of the Work Platform. Refer to the General Information section for information relevant to all UpRight work platforms. Referring to the Operator Manual will aid in understanding the operation and function of the various components and systems of the work platform, and help in diagnosing and repair of the machine.

WARNING

Be sure to read, understand and follow all information in the Operator Manual before attempting to operate or perform service on any Work Platform.

DANGER

Never perform service on the work platform in the elevating assembly area while platform is elevated without first blocking the elevating assembly.

DO NOT stand in the elevating assembly area while deploying or storing the brace.

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2-1 SUPPORTING THE ELEVATING ASSEMBLY

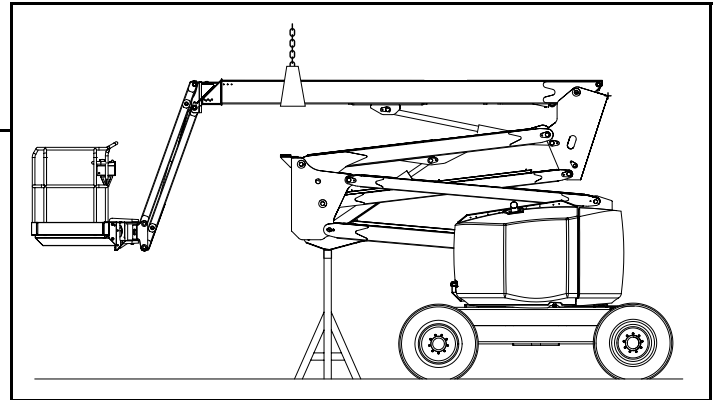
Figure 2-1: Supporting the Elevating Assembly

⚠ WARNING ⚠

Never perform service on the work platform in the elevating assembly area while the platform is elevated without first blocking the elevating assembly.

Never perform service on the boom without first supporting the boom with an overhead lifting device with a minimum capacity of two tons.

DO NOT stand in the elevating assembly area while deploying or storing the brace.



INSTALLATION OF ELEVATING ASSEMBLY BRACE

Figure 2-2: Elevating Assembly Brace

1. Park the work platform on a firm, level surface.
2. Fully retract and lower the upper boom.
3. Verify that the platform emergency stop switch is ON.
4. Turn platform/chassis switch to CHASSIS.
5. Using the Riser Raise/Lower Switch, elevate the elevating assembly.
6. Use a brace with a minimum capacity of two tons, to support the elevating assembly.
7. Using the Riser Raise/Lower Switch gradually lower the elevating assembly until the brace is supporting the elevating assembly as shown in Figure 2-2.



REMOVAL OF ELEVATING ASSEMBLY BRACE

1. Using the Riser Raise/Lower Switch, gradually raise the elevating assembly it is free of the support.
2. Remove the support.
3. Using the Riser Raise/Lower Switch, completely lower the elevating assembly.

2-2 PREVENTATIVE MAINTENANCE

The complete inspection consists of periodic visual and operational checks, along with periodic minor adjustments to assure proper performance. Daily inspection will prevent abnormal wear and prolong the life of all systems. The inspection and maintenance schedule is to be performed at regular intervals. Inspection and maintenance shall be performed by personnel who are trained and familiar with mechanical and electrical procedures.



Before performing preventative maintenance, familiarize yourself with the operation of the machine.
Always block the elevating assembly whenever it is necessary to enter the lifting assembly to perform maintenance while the platform is elevated.

Please photocopy the Preventative Maintenance Check List and use the table as a checklist when inspecting the machine for service.

PREVENTATIVE MAINTENANCE CHECK LIST

MAINTENANCE TABLE KEY

Interval

Daily = each shift or every day

50h/30d = every 50 hours or 30 days

250h/6m = every 250 hours or 6 months

1000h/2y = every 1000 hours or 2 years

Y = Yes/Acceptable

N = No/Not Acceptable

R = Repaired/Acceptable

PREVENTATIVE MAINTENANCE REPORT

Date: _____

Owner: _____

Model No: _____

Serial No: _____

Serviced By: _____

Service Interval _____

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery	Check electrolyte level	Daily			
	Clean exterior	3m			
	Clean terminals	3m			
Engine Oil and Filter	Check level and condition	Daily			
	Check for leaks	Daily			
	Change oil & filter (Diesel)	500h			
	Change oil & filter (Gas)	200h			
Engine Fuel System	Check fuel level	Daily			
	Check for leaks	Daily			
	Replace fuel filter	6m			
	Check air cleaner	Daily			
Engine Coolant	Check coolant level (with engine cold)	Daily			
	Replace coolant	3m			
Hydraulic Fluid	Check fluid level	Daily			
	Change filter	6m			
	Drain and replace with ISO 46 compatible	2y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	30d			
	Check hoses for exterior wear	30d			
Emergency Hydraulic System	Operate the emergency lowering valve and check for serviceability	Daily			
Controller	Check operation of all controls	Daily			
Control Cable	Check the exterior of the cable for pinching, binding or wear	Daily			
Platform Floor and Rails	Check fasteners for proper torque	Daily			
	Check welds for cracks	Daily			
	Check condition of platform	Daily			
	Check condition of anchorage points	Daily			
	Check condition of operator manual	Daily			
Tires	Check for damage	Daily			
	Check lug nuts (torque to 190 ft. lbs. [257Nm])	30d			
	Check air pressure (80 psi [5.5 bar])	Daily			
Hydraulic Pump	Wipe clean	30d			
	Check for leaks at mating surfaces	30d			
	Check for hose fitting leaks	Daily			
	Check mounting bolts for proper torque	30d			

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Hydraulic Drive System	Check hydraulic drive motor operation	Daily			
	Check hoses, fittings, and valve block for leaks	Daily			
Torque Hubs	Check for leaks	Daily			
	Check oil level	250h/6m			
	Change Oil after break-in period	50h/30d			
	Change Oil (SAE 90 wt. gear oil)	2000h/2y			
Steering System	Check hardware & fittings for proper torque	6m			
	Check linkage for wear areas	30d			
	Oil all pivot points	30d			
	Check steering cylinder for leaks	30d			
	Check for missing/loose retainers	Daily			
Elevating Assembly	Inspect for structural cracks	Daily			
	Check pivot points for wear	30d			
	Check pivot pin retaining bolts for proper torque	30d			
	Check members for deformation	Daily			
Chassis	Check hoses for pinch or rubbing points	Daily			
	Check component mounting for proper torque	6m			
	Check welds for cracks	Daily			
Lift Cylinder	Check the cylinder rod for wear	30d			
	Check pivot pin retaining bolts for proper torque	30d			
	Check seals for leaks	30d			
	Inspect pivot points for wear	30d			
Turret	Check fittings for proper torque	30d			
	Check ring gear for proper lubrication and wear	Daily			
	Lubricate ring gear (MoS ₂ grease)	150h/3m			
Entire Unit	Check for and repair collision damage	Daily			
	Check fasteners for proper torque	3m			
	Check for corrosion-remove and repaint	6m			
	Lubricate	30d			
Labels	Check for peeling, missing, or unreadable labels & replace	Daily			

2-3 LUBRICATION

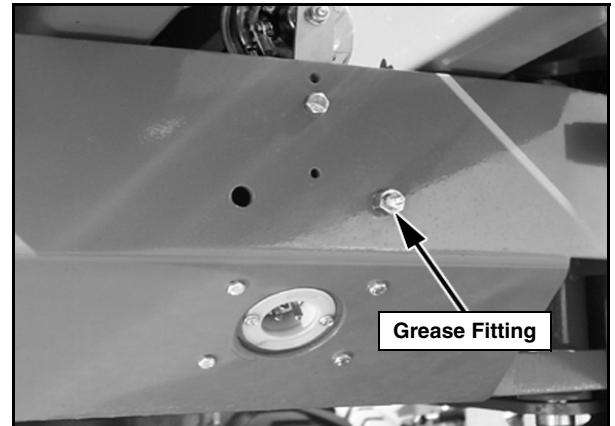
Refer to the Operator Manual for the lubrication intervals and Figure 2-3 and Figure 2-4 for location of items that require lubrication service.

TURRET BEARING

The grease fitting for the turret bearing is located at the front of the turret assembly.

1. Wipe the fitting before and after greasing.
2. Using multipurpose grease in a grease gun, pump the grease into the fitting until grease just begins to appear at the edges of the pivot.
3. Wipe off any excess grease.

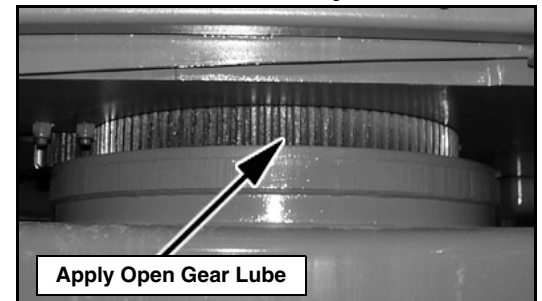
Figure 2-3: Turret Bearing Grease Fitting



LUBRICATING TURRET GEARS

Using a brush, apply open gear grease to the turret gears.

Figure 2-4: Turret Gear



HYDRAULIC FLUID AND FILTER

FLUID LEVEL

With the boom fully retracted and the platform fully lowered, check fluid level on sight gauge. If the fluid is NOT in operating range, add hydraulic fluid until fluid is visible in operating range on dipstick or visible in sight gauge. DO NOT fill above operating range or when the platform is elevated.

FLUID AND FILTER REPLACEMENT

1. Operate the platform for 10-15 minutes to bring the hydraulic fluid up to normal operating temperature.

CAUTION

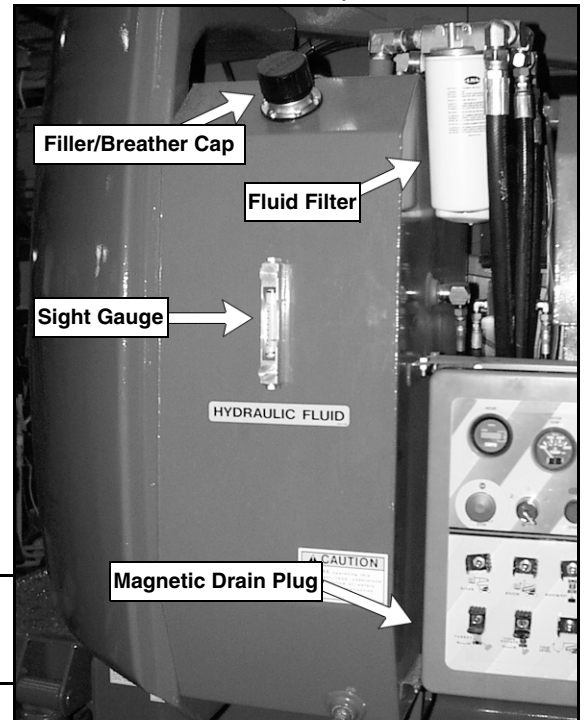
The hydraulic fluid may be hot enough to cause burns. Wear safety gloves and safety glasses when handling hot fluid.

2. Provide a suitable container to catch the drained fluid.
3. Remove the drain plug and allow all fluid to drain into the container. Be sure to dispose of fluid properly.
4. Reinstall the drain plug.
5. Remove filter element from filter head.
6. Apply a thin film of clean hydraulic fluid (ISO No.46) to the gasket of the replacement filter.
7. Thread replacement filter onto the filter head until the gasket makes contact then rotate 3/4 of a turn further.
8. Fill the hydraulic fluid tank to operating level on sight gauge with clean ISO compatible hydraulic fluid.
 - Normal Temperature, above 0° C (32° F) ISO #46.
 - Low Temperature, below 0° C (32° F) ISO #32.
 - Extreme Temperature, below -17° C (0° F) ISO #15.

ENGINE OIL

Refer to the engine manufacturer's documentation that came with your UpRight Work Platform.

Figure 2-5: Hydraulic Fluid Reservoir



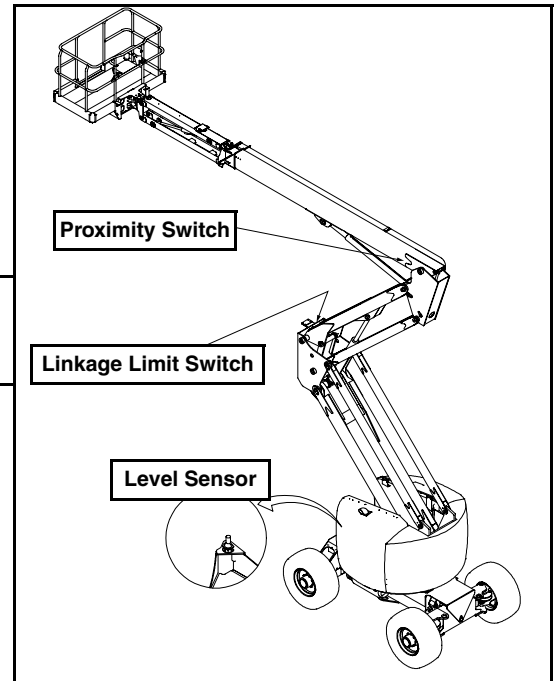
2-4 SPECIAL SWITCHES AND SENSORS

The work platform is equipped with safety switches. For operator safety, it is important that these switches be working and properly adjusted. The location of the switches is shown in Figure 2-6.

⚠ WARNING ⚠

DO NOT attempt to adjust Limit Switches without first blocking the elevating assembly. Refer to "Supporting the Elevating Assembly" on page 2-3.

Figure 2-6: Switch Locations



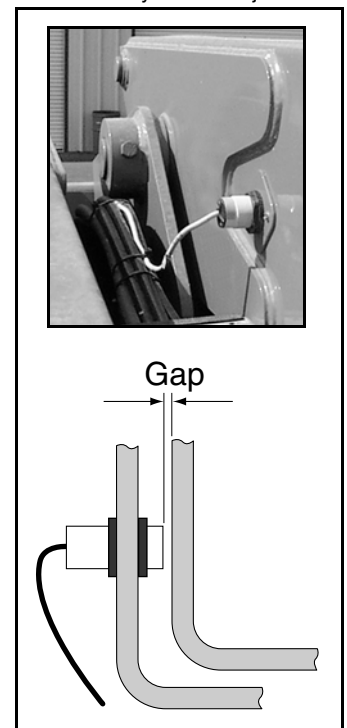
PROXIMITY SWITCH

The Proximity switch (also known as the Boom Extend switch) controls machine functions based upon whether the boom is extended or retracted. When the boom is retracted and the platform fully lowered, the Proximity switch bypasses the Level Sensor and closes the circuit to the receiver. This allows high speed travel, cage trim function, and axle float.

Figure 2-7: Proximity Switch Adjustment

TEST AND ADJUST

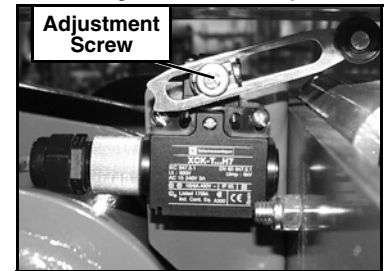
1. Lower the platform completely.
2. With the Platform/Chassis switch on CHASSIS, push the Level Sensor base to test the alarm circuit.
3. If the alarm sounds;
 - a. elevate the platform and block the elevating assembly,
 - b. adjust the gap to 0,635 cm to 0,95 cm (**1/4" to 3/8"**),
 - c. lower the platform and re-test the level sensor. When the switch is properly adjusted, the alarm will not sound.
4. With the platform elevated, repeat step 2. When the switch is properly adjusted, the alarm will sound.



LINKAGE LIMIT SWITCH

The Linkage Limit switch (also known as the Platform Down Limit switch) controls machine functions based upon whether the elevating assembly is elevated or lowered. When the platform fully lowered and the boom is retracted, the Linkage Limit switch bypasses the Level Sensor and closes the circuit to the Platform Down Relay. This allows high speed travel and jib function.

Figure 2-8: Linkage Limit Switch Adjustment



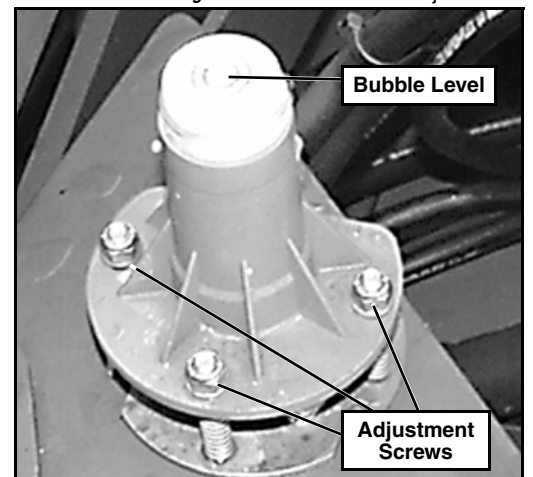
TEST AND ADJUST

1. Lower the platform completely.
2. With the Platform/Chassis switch on CHASSIS, push the Level Sensor base to test the alarm circuit.
3. If the alarm sounds;
 - a. elevate the platform and block the elevating assembly,
 - b. adjust the position of the switch arm by loosening the adjustment screw and repositioning the arm,
 - c. lower the platform and re-test the level sensor. When the switch is properly adjusted, the alarm will not sound.
4. With the platform elevated, repeat step 2. When the switch is properly adjusted, the alarm will sound.

LEVEL SENSOR

The Level Sensor (also known as the Tilt Sensor) has three wires: red, power (12v in); black, ground; and white, output (12v out). To verify that the sensor is working properly, there is one red LED under the sensor that indicates the sensor is off level.

Figure 2-9: Level Sensor Adjustment



TEST AND ADJUST

1. Check tires for proper pressure (not required for poly filled tires).
2. Place the machine on a firm, level surface.
3. Use Inclinator to ensure that the front and rear of the chassis are level within $\pm 1/4^\circ$.
4. Adjust the three leveling locknuts until the bubble is centered in the circle on the attached bubble level.
5. Elevate the platform until Linkage Limit switch opens, and push the Level Sensor base to test the alarm circuit. The red LED should turn on, and the alarm should sound.

2-5 HYDRAULIC MANIFOLD

It is not necessary to remove the manifold to perform all maintenance procedures. Prior to performing maintenance, determine if the manifold needs to be removed.

REMOVAL

1. Disconnect the battery.
2. Tag and disconnect the solenoid valve leads from the terminal strip.
3. Tag, disconnect, and plug hydraulic hoses.
4. Remove the bolts that hold the manifold to the mounting bracket.
5. Remove the manifold block.

REPAIR

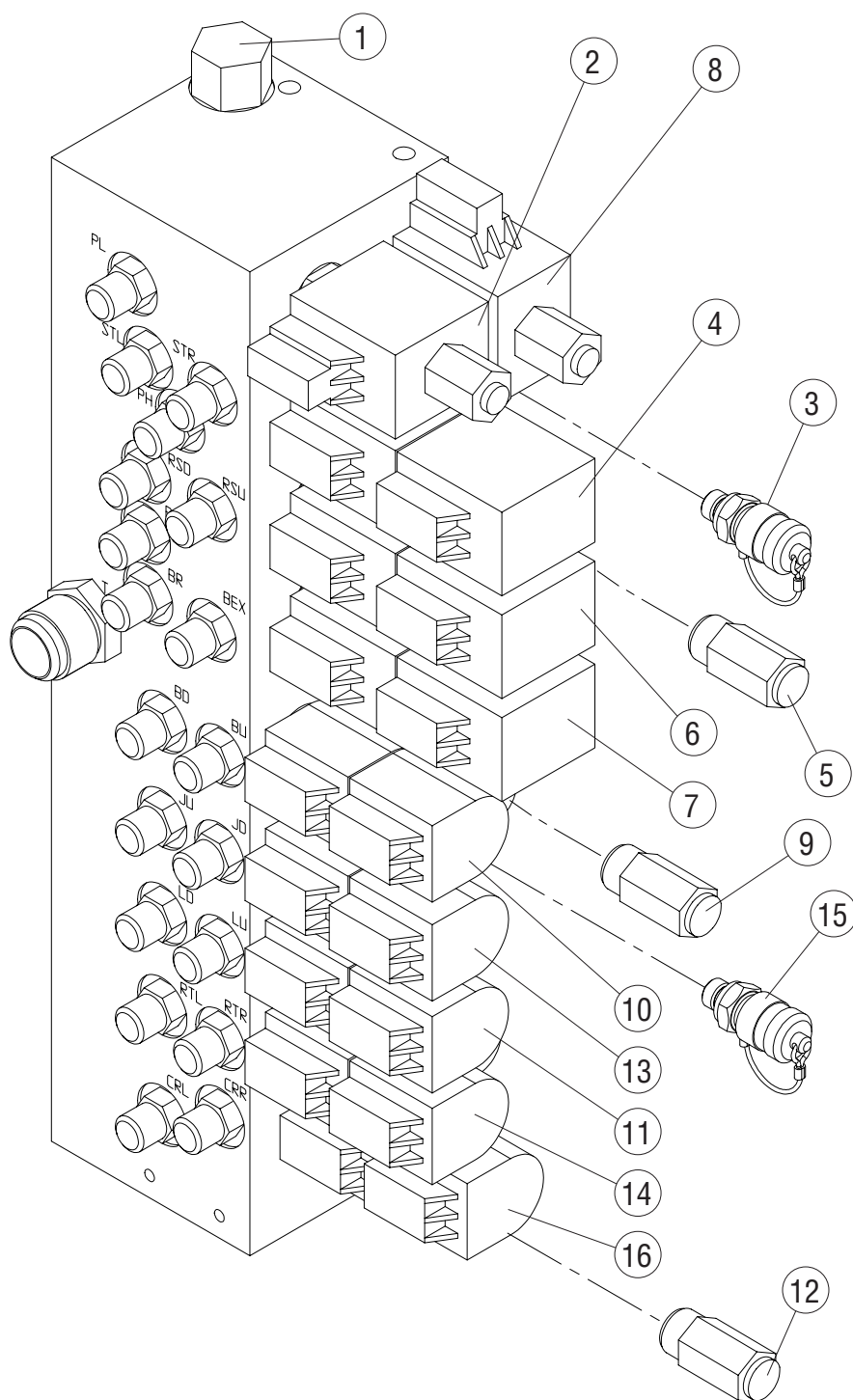
Refer to the *General Information* section for instructions on Disassembly, Cleaning and Inspection, and Assembly.

NOTE: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 2-10 on page 2-11 often to aid in disassembly and assembly.

INSTALLATION

1. Attach manifold assembly to mounting plate with bolts.
2. Connect solenoid leads to terminal strip (as previously tagged).
3. Connect hydraulic hoses. Be certain to tighten hoses to manifold.
4. Reconnect the battery.
5. Operate each hydraulic function and check for proper operation and leaks.
6. Adjust lift relief and counterbalance valve pressures according to "Setting Hydraulic Pressures" on page 2-12.

Figure 2-10: Hydraulic Manifold



1. Diverter Valve
2. High Flow Proportional Valve
3. Gage Port Plug - High Pressure
4. Steering Valve
5. High Pressure Relief Valve
6. Spool Valve - Riser Valve
7. Boom Extend/Retract Valve
8. Low Flow Proportional Valve
9. Low Pressure Relief Valve

10. Boom Raise Valve
11. Platform Level Valve
12. Platform Rotate Flow Control Valve
13. Jib Valve
14. Turret Rotate Valve
15. Gage Port Plug - Low Pressure
16. Platform Rotate Valve

2-6 SETTING HYDRAULIC PRESSURES

Figure 2-10: "Hydraulic Manifold," on page 2-11 shows complete hydraulic manifold assembly.

NOTE: Check hydraulic pressures whenever the pump, manifold, or any relief valve has been serviced or replaced.

HIGH PRESSURE RELIEF VALVE

1. Operate the hydraulic system 10-15 minutes to warm the fluid.
2. Install a 0-207 bar (**0-3000 PSI**) pressure gauge to the pressure test port #3-using Part # 063965-002, Quick Disconnect Adapter.
3. Retract boom completely.
4. While activating the boom retract function, set the pressure to 186 bar (**2700 PSI**) maximum by slowly turning the adjusting screw. Turning the adjusting screw clockwise increases pressure; counterclockwise decreases pressure.
5. Remove the pressure gauge, and reinstall all plugs.

LOW PRESSURE RELIEF VALVE

1. Operate the hydraulic system 10-15 minutes to warm the fluid.
2. Install a 0-207 bar (**0-3000 PSI**) pressure gauge to the pressure test port.
3. Completely extend jib function.
4. Continue activating function and set the pressure to 97 bar (**1400 PSI**) by slowly turning the adjustment screw. Turning the adjusting screw clockwise increases pressure; counterclockwise decreases pressure.
5. Remove the pressure gauge, and reinstall all plugs.

COUNTERBALANCE RELIEF VALVES

1. If any counterbalance relief valve is faulty, completely lower the jib, and retract the boom.
2. Replace or recalibrate the counterbalance valve.
3. Slowly cycle function related to replaced counterbalance valve several times to remove air from the system.

2-7 TORQUE HUBS

NOTE: Change fluid in the torque hubs after the first 50 hours of operation. Change every 1000 hours thereafter.

CHANGING FLUID

NOTE: It is not necessary to remove the torque hub to change fluid.

1. Park the work platform on a firm level, surface and block the wheels to prevent the work platform from rolling.
2. Raise the axle using an eight-ton hydraulic jack. Place one eight ton-jack stand under each end of the axle.
3. Loosen the wheel lug nuts.
4. Remove the wheel and rotate the torque hub so the drain plug on its side is at the bottom of the hub.
5. Remove the drain plugs at the bottom of the hub and front cover, and drain the fluid from the unit.
6. Rotate the hub so that the plug opening in the front cover is slightly above the half full position, and the side plug opening is at the top.
7. Fill the unit with 90 wt. gear oil until oil comes out of the front plug opening (the torque hub must be $\frac{1}{2}$ full).
8. Replace the plugs.
9. Install the wheel and lower the machine to the surface.

TORQUE HUB REMOVAL

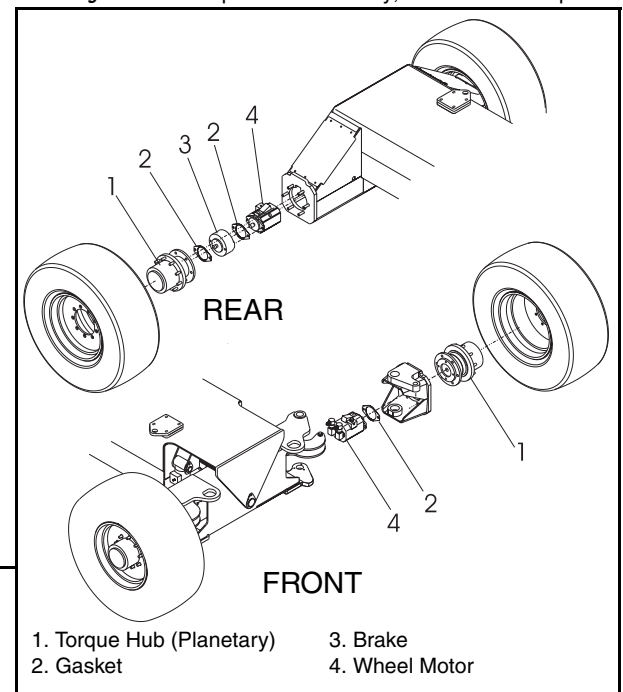
1. Park the work platform on a firm level, surface and block the wheels to prevent the work platform from rolling.
2. Disconnect the battery negative terminal.
3. Loosen the wheel lug nuts on the torque hub to be removed.
4. Raise the axle of the work platform using an eight-ton jack.
5. Position two eight-ton jack stands under the axle.
6. Remove the wheel nuts and the wheel.
7. Disconnect the hydraulic brake line from the brake.

CAUTION

Clean all fittings before disconnecting the hose assemblies.

Plug all port holes and hose assemblies IMMEDIATELY to prevent contamination from dust and debris.

Figure 2-11: Torque Hub Assembly, Remove and Replace



8. Mark and remove the hoses from the drive motor.
9. Remove the mounting bolts from the drive motor.
10. Separate the drive motor from the brake. Discard the gasket.
11. Separate the brake from the torque hub. Discard the gasket.
12. Remove the $\frac{1}{2}$ -20 nuts and washers from the torque hub.
13. Remove the torque hub.

TORQUE HUB INSTALLATION

Refer to Figure 2-11 on page 2-13.

NOTE: Torque all hardware to torques listed in the General Information section unless otherwise specified.

1. Install the torque hub using hardware previously removed.
2. Using SAE 90W weight gear lube, fill the torque hub. The torque hub must be half full.
3. Using a new gasket, install the brake.
4. Using a new gasket, install the drive motor.
5. Secure the assembly using washers and bolts.
6. Connect the hydraulic brake lines.
7. Connect the hoses to the drive motor.
8. Install the wheels. Torque the lug nuts to 257Nm (190 ft/lbs).
9. Bleed the brake lines if necessary.
10. Remove the jack stands and lower the rear end.
11. Connect the battery terminal.
12. Operate the machine and check for proper operation of the torque hub. Check the function of the brake.

DISASSEMBLY OF TORQUE HUB

Refer to Figure 2-12 on page 2-17.

1. Slide the coupling (1) from the splines on the input shaft (2).
2. Position the assembly upright on the face of the spindle.
3. Remove the disengage cover (31) if necessary.
4. Remove the eight bolts (29) and the large cover (28) from the unit. The thrust washer (25) and the disengage plunger (26) usually remain attached to the large cover (28) when it is removed. Remove the thrust washer (25), disengage the plunger (26) and O-ring (27) from the large cover (28).
5. Remove the primary sun gear (24) from the end of the input shaft (2).
6. Remove the primary carrier assembly (22).
7. Remove the secondary carrier assembly (21).
8. Remove the input shaft (2) from the spindle (3). Remove the retaining rings (17), washers (18), and disengage spring (19) from the input shaft (2) only if replacement is required.
9. One tab of the lock washer (15) will be engaged in the slot of the bearing nut (16); bend back to release. Remove the bearing nut (16), lock washer (15), and thrust washer (14).

NOTE: A special locknut wrench is required for the removal of the bearing locknut. The Bearing Locknut Tool, Bearing Cone Driver and Spindle/Shaft Drive Tool are included in the Service Kit, part number 100254-020.

10. Bolt the Spindle Drive Tool (Service Kit #100254-020) to the ring gear (20). Grade 8 bolts should be used. Drive the spindle (3) from the hub by turning the center bolt of the Spindle Drive Tool. Care should be taken to avoid damaging splines and threads on spindle.

NOTE: Bearing cone (13) has been designed with a press fit with respect to spindle (3). Considerable force will be required to remove the cone from the spindle.

11. Remove the Spindle Drive Tool from the ring gear (20).
12. Remove the eighteen bolts (9) and washers (10) from the hub (11) and remove the ring gear (20). It may be necessary to strike the ring gear (20) with a rubber mallet to loosen it from the hub (11).
13. Remove the boot seal (4) and oil seal (5) and bearing cones (6 & 13) from the hub (11). Inspect the bearing cups (7 & 12) in position and remove only if replacement is required.

ASSEMBLY OF TORQUE HUB

Refer to Figure 2-12 on page 2-17.

1. Press new bearing cups (7 & 12) into each side of the hub (11). It is recommended that bearing cups (7 & 12) and cones (6 & 13) be replaced in sets.
2. Assemble the bearing cone (6) into the cup (7) at the seal end of the hub (11) and press a new seal (5) into the hub (11). Install the boot seal (4) on the hub (11) if the unit is so equipped.
3. Position the spindle (3) upright on a work bench. Lubricate the lips of the seal (5) and lower the hub (11) onto the spindle (3). The hub (11) should be centered as it is lowered over the spindle (3) to prevent seal damage.
4. Assemble the bearing cone (13) over the spindle (3). Press the bearing cone (13) over the spindle bearing journal using a press and cylindrical Bearing Cone Driver (Service Kit 100254-020). Press the bearing cone (13) down until the rollers just touch the cup (12). Take care to avoid pressing the cone (13) too far.

NOTE: If a press is not available, place the Bearing Cone Driver Tool over the spined end of the spindle (3) on the edge of the bearing cone (13), and drive it into place with a hammer or mallet. If this method is used, care must be taken to avoid damage to the bearing cone and spindle.

5. Install the thrust washer (14) with the tab in the keyway of the spindle and bearing nut (16). **DO NOT install the lock washer (15) at this time.**
6. Clean the mating surfaces and apply a bead of silicone sealant to the face of the hub (11) that mates with the ring gear (20). See the instructions on the sealant package. The hub (11) is attached to the ring gear (20) with 18 3/8-24 grade 8 hex head cap screws (9) and flat washers (10). Torque the cap screws to 70-81 Nm (**50-52 ft/lbs.**).
7. Place the Spindle Drive Tool (Service Kit #100254-020), over the spindle (3) and bolt or pin to the ring gear (20). Make sure the center bolt of the Drive Tool is not touching the spindle and is prevented from rotating by jam nuts provided on tool.
8. Check the initial rolling torque by installing a Nm (**in/lbs**) torque wrench (arm or dial type) on the center nut of the Spindle Drive Tool and turning the hub (11) slowly and steadily with the torque wrench. Note the mean torque. An initial bearing torque of greater than 81 Nm (**52 in/lbs**) with the boot seal installed or 4,3-5,2 Nm (**38-46 in/lbs**) without the boot seal means that the cone (13) was pressed on too tightly in step 4. In this case, back off the bearing cone (13) by pressing the spindle (3) out of the cone (13) until the initial preload is relieved. See step 10 of the disassembly procedure.
9. Torque the bearing nut (16) with the Bearing Locknut Tool (Service Kit #100254-020) until a bearing rolling torque of 4,8-5,7 Nm (**42-50 in/lbs**), with a boot seal installed, or 5,2 Nm (**46 in/lbs**), without a boot seal, is reached. This may require several trials of pressing the cone (13) by torquing the nut (16) and then checking the rolling torque. Rotate hub (11) by hand as nut is being tightened in order to seat the bearings.
10. Up to 339 Nm (**250 ft/lbs**) of torque may have to be applied to the bearing nut (16) in order to press the cone (13) into position.
11. Remove the bearing nut (16) and install the lock washer (15). Replace the bearing nut (16).
12. Re-torque the bearing nut (16) to 80-90 Nm (**60-70 ft/lbs**).
13. Secure the bearing nut (16) by bending a lock washer (15) tab into one of the four bearing nut slots. If no tab aligns with a slot, the nut may be tightened until one of the slots aligns with a lock washer tab.
14. Assemble a washer (18), spring (19), a second washer (18), and a retaining ring (17) in the middle grooves of the input shaft (2). Install a second retaining ring (17) in the groove near the small end of the input shaft (2).
15. Assemble the splined end of the input shaft (2) down into the spindle (3).
16. Assemble the secondary carrier assembly (21) to the spindle (3) at the splines.
17. Assemble the primary carrier assembly (22) into the ring gear (20). It will be necessary to rotate the carrier to align the secondary sun gear (part of primary carrier assembly (22)) with the planet gear teeth in the secondary carrier assembly (21). Assemble the primary sun gear (24) over the input shaft (2). Rotate the primary sun gear (24) to align the input shaft (2) to the gear splines and the gear teeth in the primary carrier assembly (22).

18. Lubricate the O-ring (27) and assemble in the groove inside the cover hole; push the disengage plunger (26) into the cover (28) with the pointed end facing inside of the unit.
19. Assemble the thrust washer (25) with the tangs engaged with the cover (28). A small amount of grease applied to the back side of the thrust washer (25) will hold the washer in place. Apply a bead of silicone sealant to the end of the face of the ring gear (20).
20. Assemble the cover (28) aligning the holes of the cover and ring gear. Assemble the eight 5/16-18 x 1 inch hex head bolts (29). Torque the bolts to 27-34 Nm (**20-25 ft/lbs**).
21. Assemble the disengage cover (31) with the dimpled center protruding out if the wheel is to be used to drive the vehicle.
22. Assemble and torque the two 5/16-18 x 1/2 inch bolts (32). Torque the bolts to 13-27 Nm (**10-20 ft/lbs**).
23. Invert the torque hub assembly and assemble the coupling (1), with counterbore out, to the input shaft (2).
24. After the motor is assembled to the drive, or the drive is sealed at the spindle, fill with lubricant to the proper level and replace all plugs.

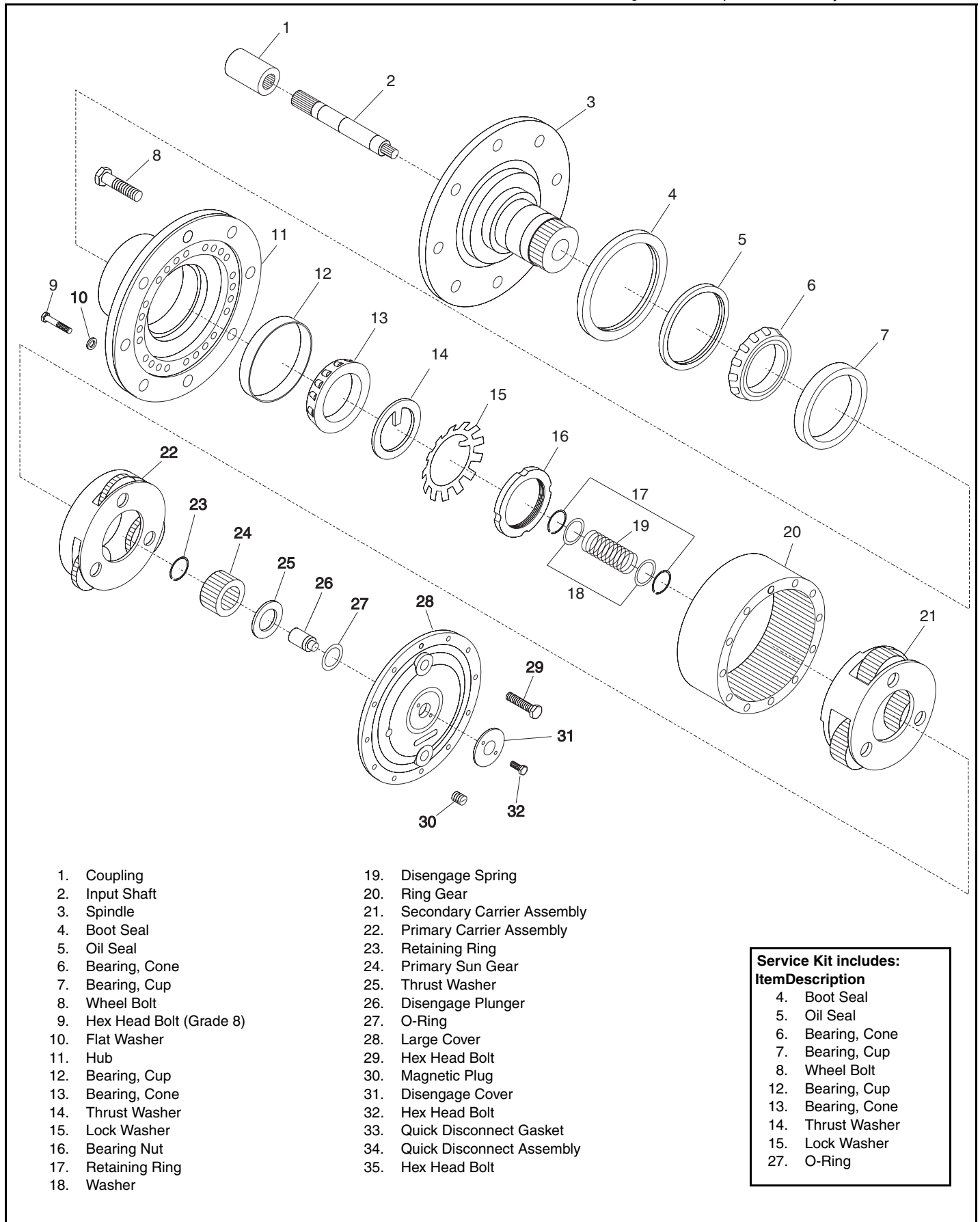
CARRIER ASSEMBLIES

Do not attempt to service primary or secondary carrier assemblies.

SEALING COMPOUND

Silastic RTV732 sealer and General Electric Silimate RTV No. 1473 or RTV No. 1503 are currently recommended for sealing gasket surfaces. Sealant should be applied in a continuous bead, which should be centered on the surface to be sealed but should move to the inside of the hole at each bolt hole location.

Figure 2-12: Torque Hub Assembly, Seal kit Installation



2-8 CYLINDERS

Refer to the General Information section for basic cylinder repair instructions.

Figure 2-13: Master Cylinder

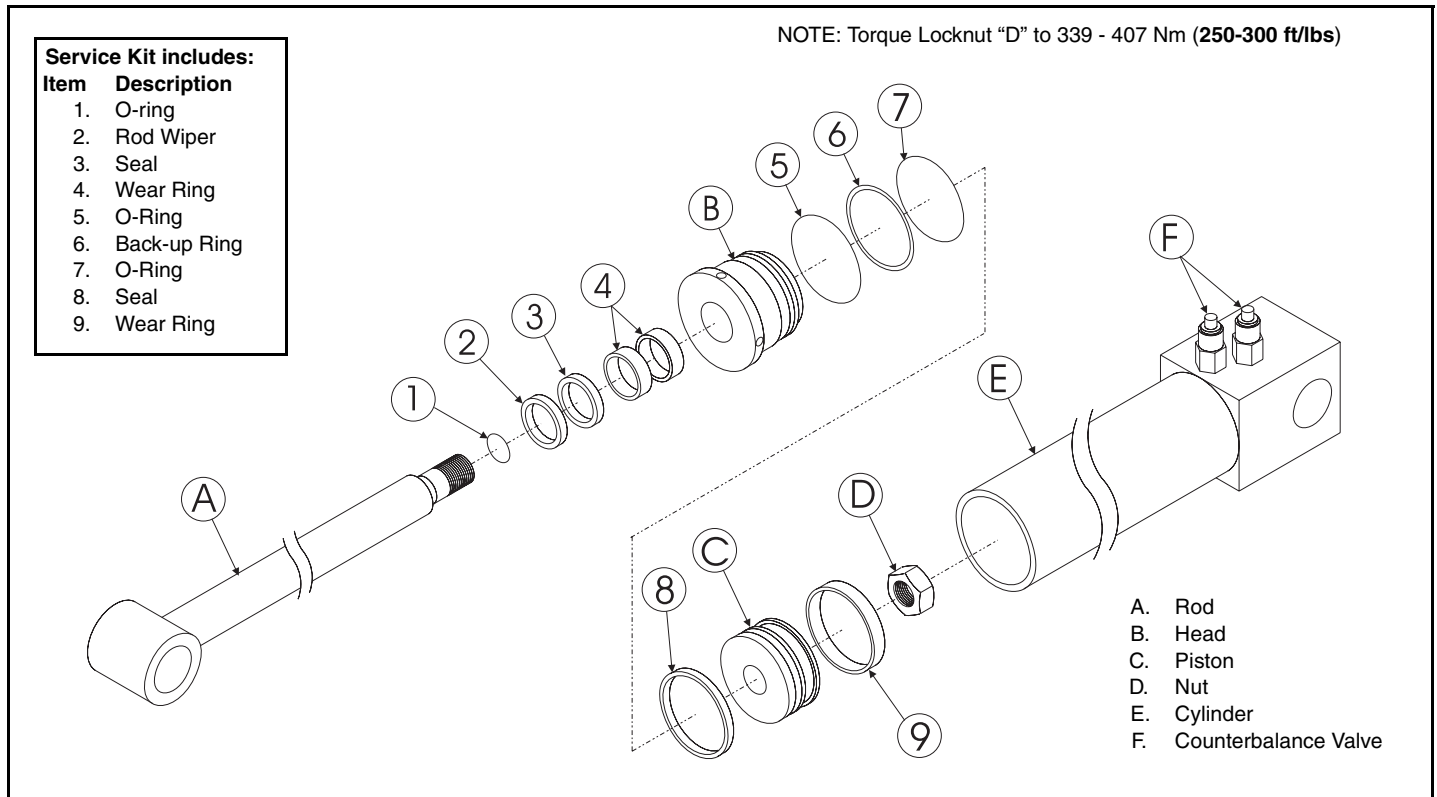


Figure 2-14: Riser Cylinder

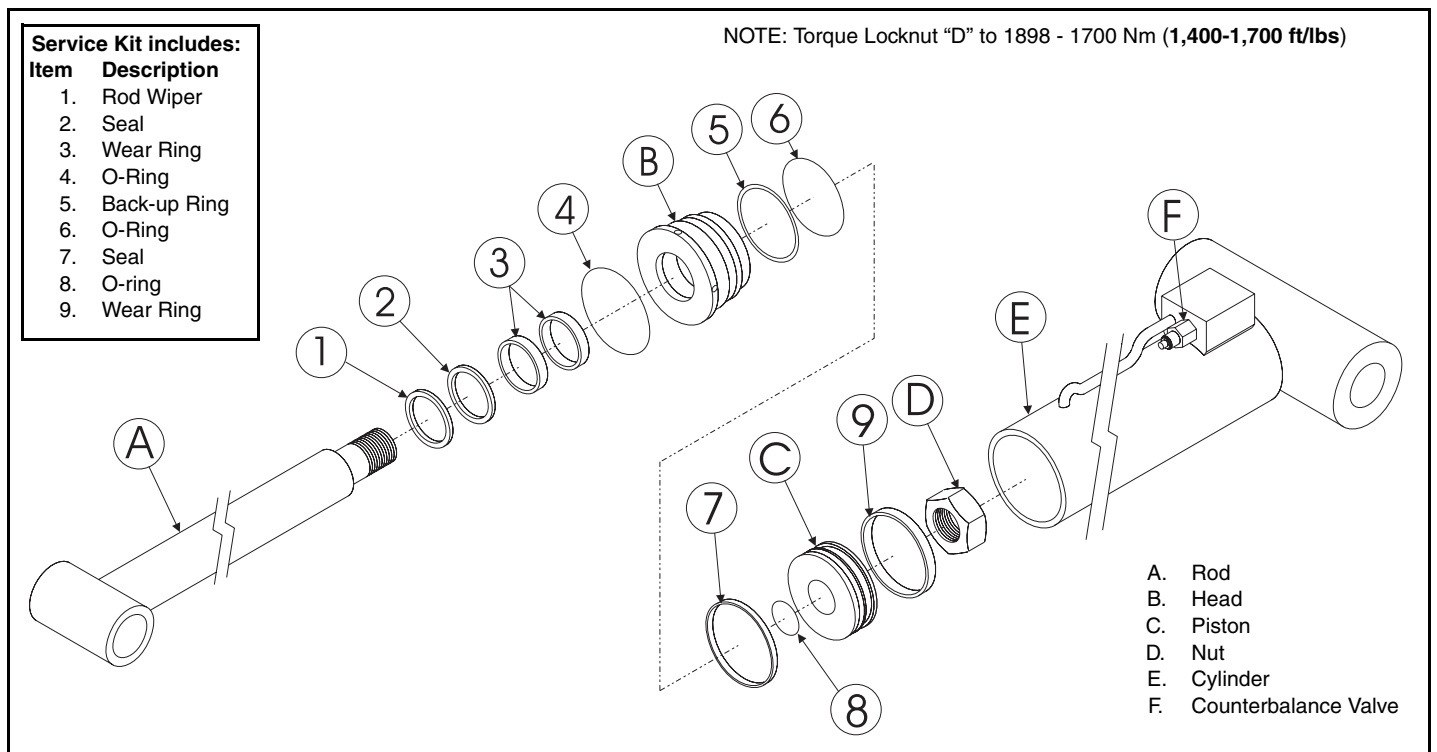


Figure 2-15: Boom Cylinder

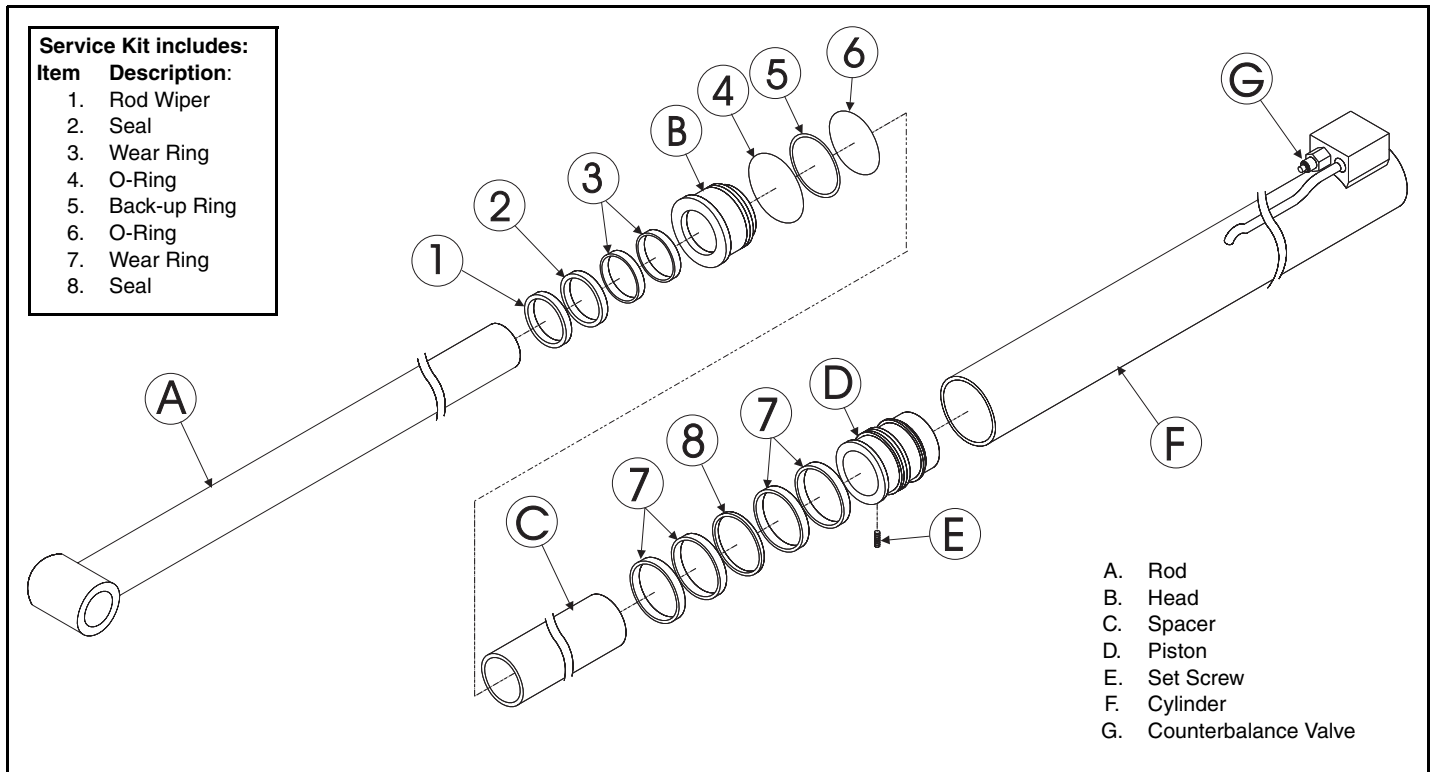


Figure 2-16: Extend Cylinder

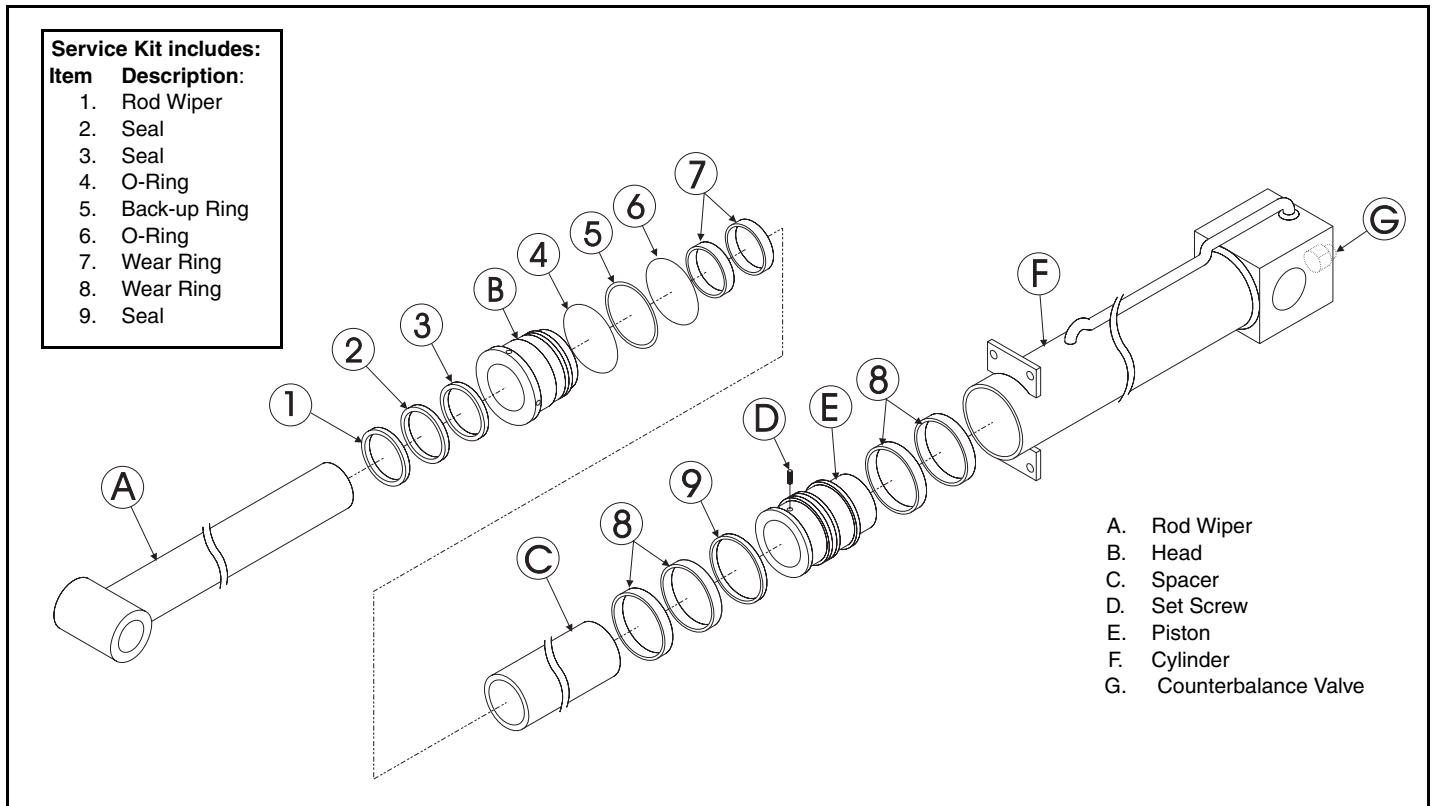


Figure 2-17: Axle Lock Cylinder

NOTE: Torque Locknut "D" to 237 - 271 Nm (175-200 ft/lbs)

Service Kit includes:**Item Description:**

1. O-Ring
2. Rod Wiper
3. Seal
4. Wear Ring
5. O-Ring
6. Back-up Ring
7. O-Ring
8. Seal
9. Wear Ring

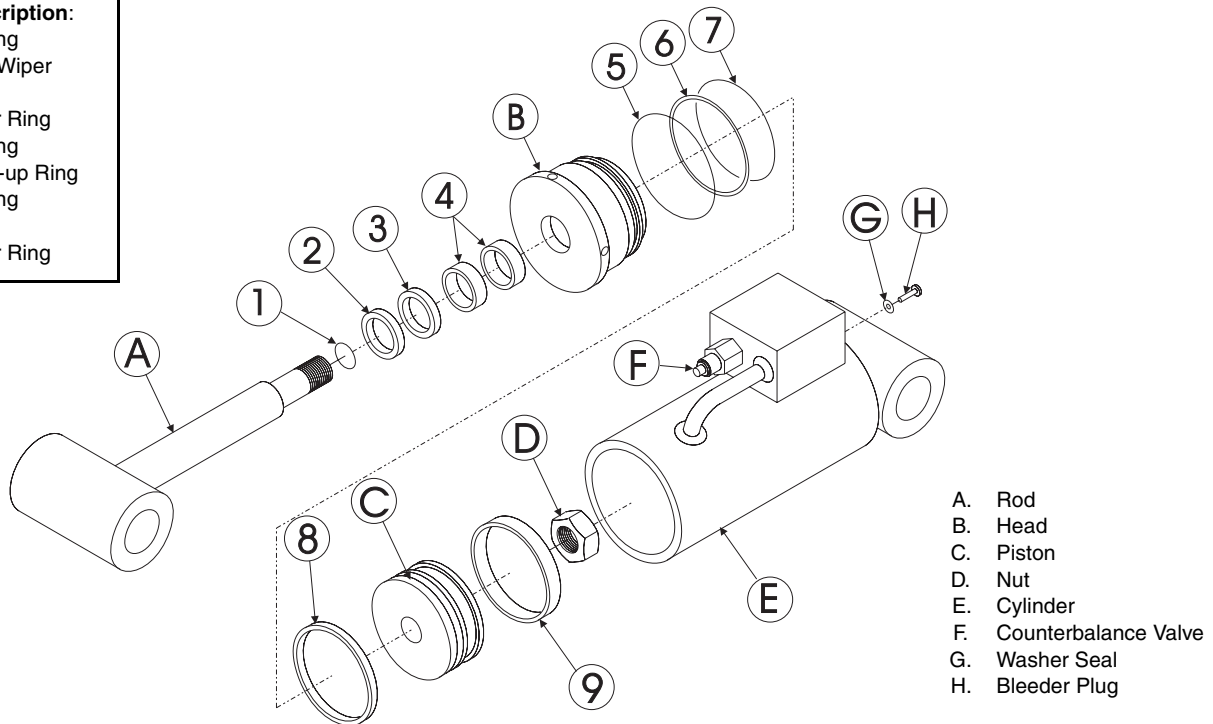


Figure 2-18: Steering Cylinder

Service Kit includes:**Item Description:**

1. O-Ring
2. Rod Wiper
3. Seal
4. Wear Ring
5. Back-up Ring
6. O-Ring
7. Wear Ring
8. Seal

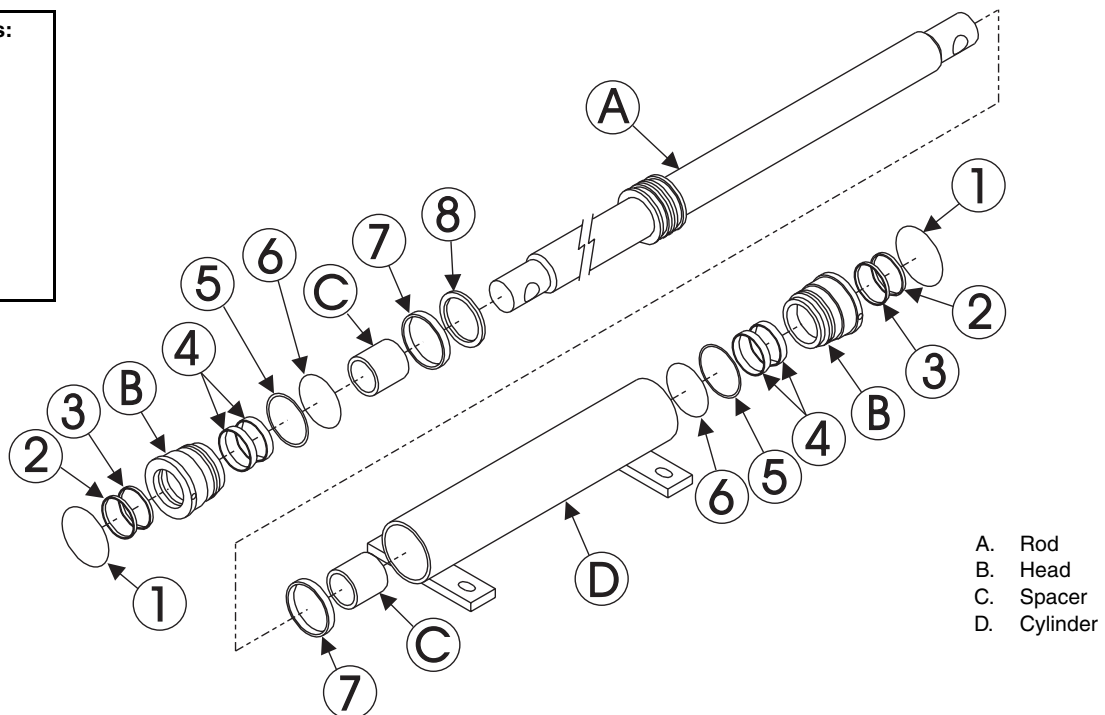
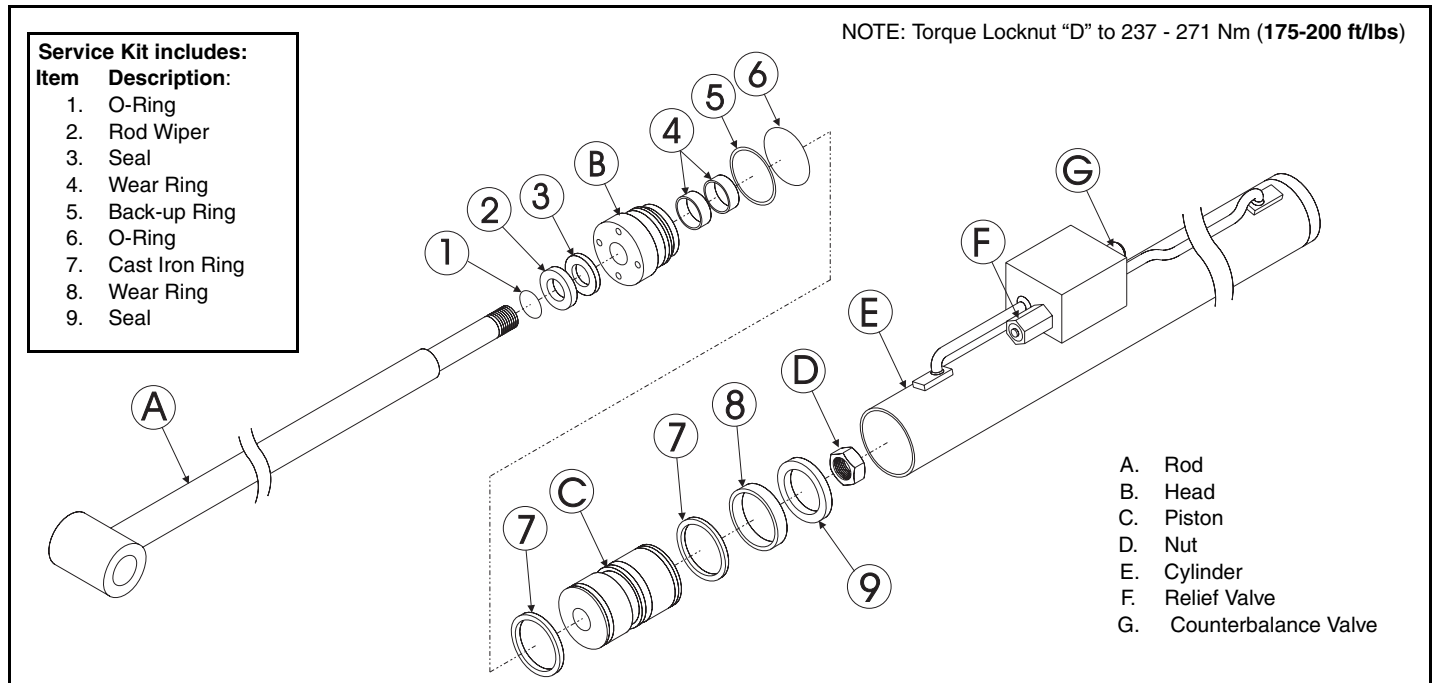


Figure 2-19: Jib Cylinder

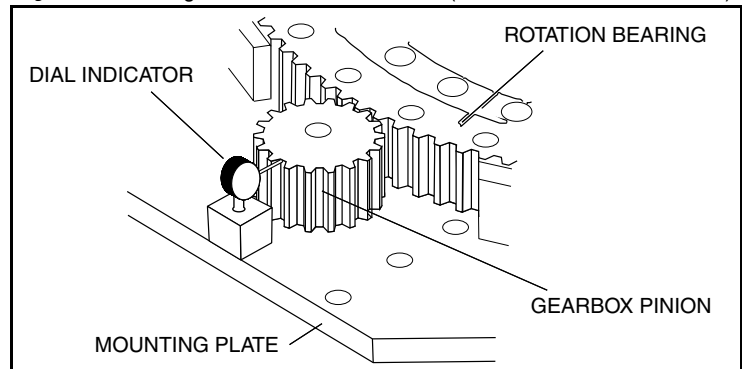


2-9 SETTING THE BACKLASH ON THE ROTATIONAL GEAR

Backlash is the shortest distance between tooth surfaces of adjacent teeth in mating gears.

1. Position boom directly over center of rear axle (standard forward driving position).
1. Loosen the gearbox mounting bolts just enough to allow the gearbox to be adjusted in and out.
2. Turn adjusting screws in until gearbox teeth make contact with bearing teeth and adjusting screws become snug.
3. Unscrew adjusting screws five turns. Do not move the gearbox.

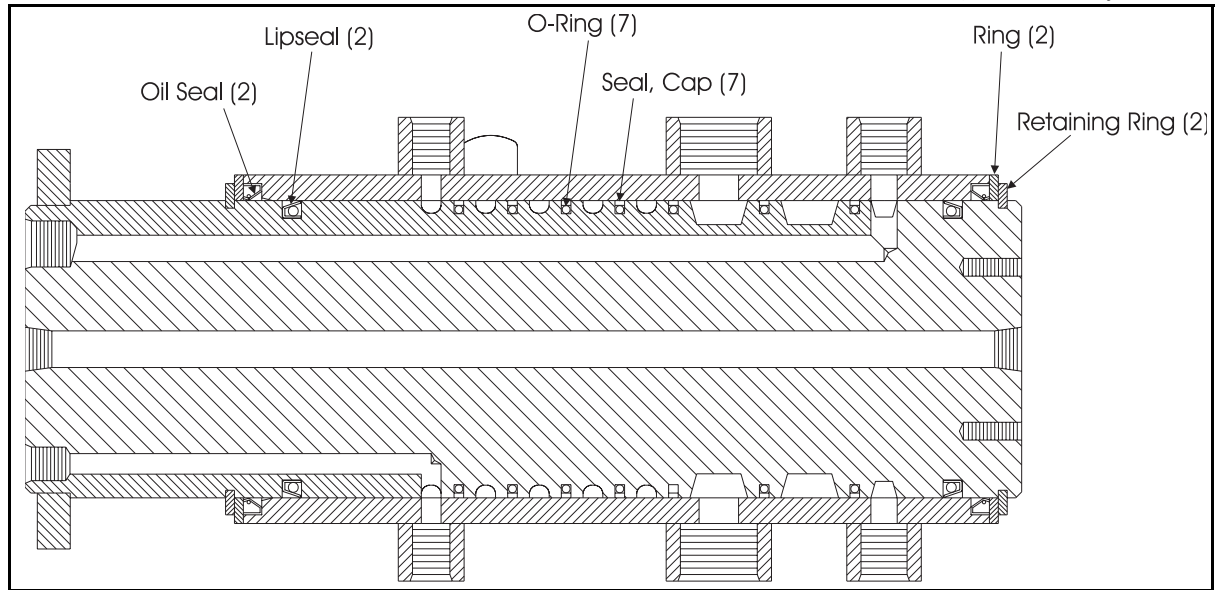
Figure 2-20: Setting Rotational Gear Backlash (Viewed from bottom of turret)



4. Place the magnetic indicator base on the bottom of the turret assembly. Set the dial indicator probe on the gearbox pinion straight across from the bearing and adjust the dial to ZERO.
5. Move the gearbox away from the bearing until the indicator shows the correct amount of backlash 0,178mm - 0,229mm (.007"-.009").
6. Carefully torque the gearbox mounting bolts while watching the indicator to make sure the correct backlash is maintained.
7. Snug the adjusting bolts against the gearbox and tighten the jamb nuts.

2-10 ROTARY MANIFOLD REMOVAL

Figure 2-21: Rotary Manifold



1. Mark and tag all hoses.
2. Remove all hoses from Rotary Manifold.
3. Remove Rotary Manifold from the machine.

NOTE: Provide a clean work area for this operation, and observe clean assembly practices. Seals and O-rings are highly sensitive to contamination that may not be visible to the naked eye.

DISASSEMBLY

1. Remove Retaining Rings from each end of Rotary Manifold.
2. Carefully slide body out of housing.
3. Remove seal kit components (O-rings, seals, and retaining rings).
4. Thoroughly clean all parts with solvent. Rinse the inside of the tube and allow to drain. A high pressure rinse and wipe with a lint free rag is preferable.
5. Inspect the body and housing for scratches, pits, or polishing. Check seal grooves and sealing surfaces. Scratches or pits deep enough to catch the fingernail are unacceptable, replace the manifold.

ASSEMBLY

NOTE: Torque all hardware and fittings to torques listed in the General Information section unless otherwise specified.

1. Lubricate all seals with clean hydraulic fluid prior to assembly.
2. Install new seals on body and housing.
3. Carefully slide body into housing.
4. Reinstall O-rings and retaining rings.

INSTALLATION

1. Installation is reverse of removal.
2. Replenish hydraulic fluid in tank.
3. Run hydraulic system for several minutes to remove air from hydraulic lines. Cycle cylinders for each boom function.
4. Rotate turret completely.
5. Check Rotary Manifold for leaks. Check that all boom functions are operating properly.

TROUBLESHOOTING

This section contains troubleshooting Truth Tables for the AB62 Work Platform.

Careful inspection and accurate analysis of the symptoms listed in the Troubleshooting Guide will localize the trouble more quickly than any other method. This manual cannot cover all possible problems that may occur. If a specific problem is not covered in this manual, call our toll free number for service assistance.

Referring to the Operator Manual and the Schematics section will aid in understanding the operation and function of the various components and systems of the Work Platform and help in diagnosing and repair of the machine.

WARNING

When troubleshooting, ensure that the work platform is resting on a firm, level surface.

When performing any service which requires the platform to be raised, the Elevating Assembly must be blocked.

Disconnect the battery when replacing or testing the continuity of any electrical component.

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3-1 TECHNICAL SUPPORT

Technical Support is available by telephone or FAX.

UPRIGHT USA

Tel: 1-800-926-5438
FAX: 1-559-662-4785

UPRIGHT EUROPE

Tel: +353-1-620-9300
FAX: +353-1-620-9301

3-2 GENERAL PROCEDURE

Thoroughly study hydraulic and electronic schematics in **the Schematics section**. Check for loose connections and short circuits. Check/repair/replace each component in the Truth Table which is listed under each machine function which does not operate properly.

Determine whether the problem is mechanical (interference), electrical or hydraulic. Some functions require power at more than one solenoid.

Use the charts on the following pages to help determine the cause of a fault in your UpRight work platform

NOTE: Spike protection diodes at components have been left out of the charts to eliminate confusion.

3-3 TROUBLESHOOTING PROCEDURES

1. Verify your problem.
 - Do a full function test from both platform controls and chassis controls and note all functions that are not operating correctly.
2. Narrow the possible causes of the malfunction.
 - Use the troubleshooting guide to determine which components are common to all circuits that are not functioning correctly.
3. Identify the problem component.
 - Test components that are common to all circuits that are not functioning correctly. Remember to check wires and terminals between suspect components. Be sure to check connections to battery negative.
4. Repair or replace component found to be faulty.
5. Verify that repair is complete.
 - Do a full function test from both platform and chassis controls to verify that all functions are operating correctly and machine is performing to specified values

3-4 ADJUSTMENT PROCEDURES

- Hydraulic settings must be checked whenever a component is repaired or replaced.
- Remove counterbalance valves and "bench test" them if they are suspect.
- Connect a pressure meter of appropriate range to the test port located on the right side of the hydraulic manifold.
- Correct pressure settings are listed in the hydraulic schematic.
- Refer to DMR 30 settings listed in this section.

3-5 CHECKING PUMP PRESSURES

DRIVE PUMP

- Check charge pressure at tee added to charge filter line.
- To check drive pressure, connect pressure tester to port "G" on the 2-speed/axle lock valve block.

3-6 TROUBLESHOOTING THE DMR-30 CONTROLLER

Figure 3-1: DMT-30 Transmitter

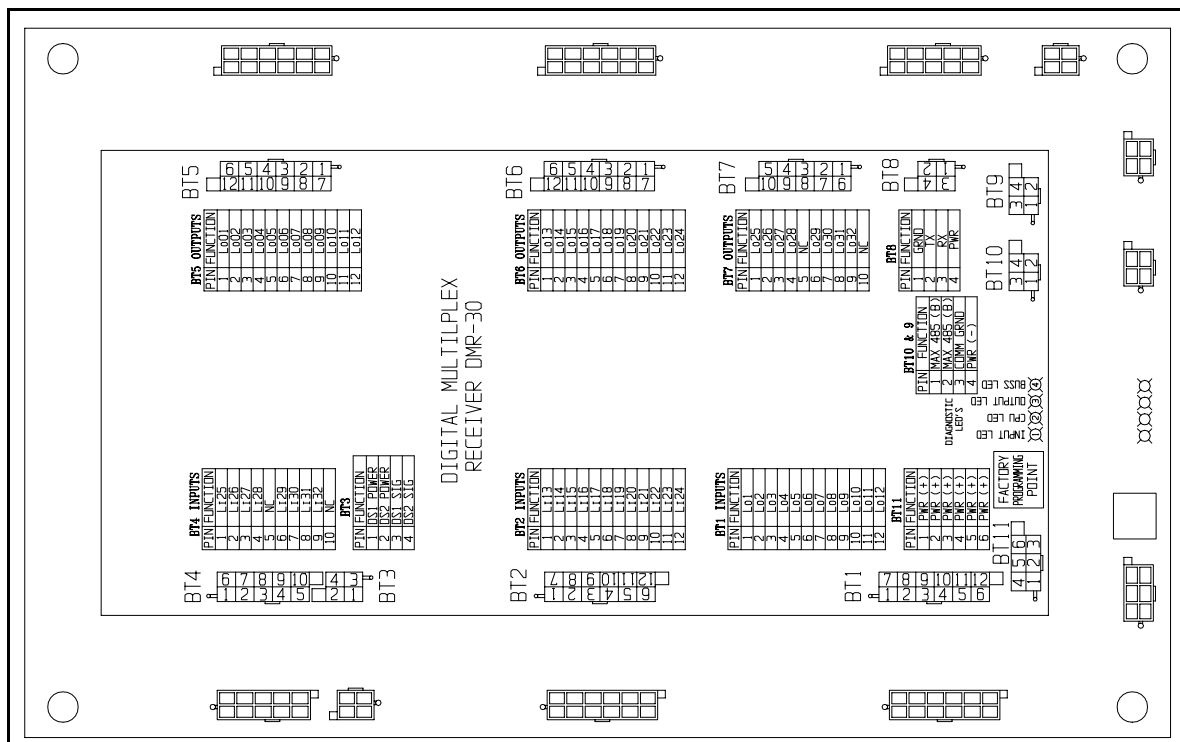
There are two components to the DMR-30 system. A DMT-30 transmitter in the upper control box transmits inputs from the operator controls to the DMR-30 receiver in the lower control box. The DMR-30 receives the digital signal and commands the appropriate functions. A corresponding LED for each input and output is added to the DMR30 -DMT-30 for easier diagnosis.

These LEDs correspond to wire position in the plugs and acknowledge a signal on the wire. Using the charts in Figure 3-1 and Figure 3-2, a signal or series of signals can be followed from switch to actuator to help in determining the cause of a problem. More information about these LEDs can be found in "Machine Operation Check List" on page 4.

Four "blinking" diagnostic LEDs, located at the bottom-center of the DMR-30, are labeled as to their function and are also used for diagnostic purposes.

- CPU LED:** The DMR-30 is powered up operating properly. Solid light indicates internal failure. Not lit when no power input.
- INPUT LED:** Indicates an input from lower control panel switches, including ignition switch. This LED should flash with the CPU LED.
- OUTPUT LED:** Indicates an output to boom or drive functions. This LED flashes only when operating boom or drive functions from either controller.
- BUSS LED:** Indicates an input from the DMT-30 (upper controller). This LED should flash with the CPU LED and the INPUT LED as the upper ignition must be on to operate.

Figure 3-2: DMR-30 Receiver



3-7 MACHINE OPERATION CHECK LIST

LOWER CONTROL BOX

ELECTRICAL POWER UP

- Both Emergency Stop Switches are pulled out.
- Lower control box key switch is in CHASSIS position.
- Upper controls key is ON.
- BT1-03 (chassis selected) is illuminated.
- The CPU LED on the DMR-30 should be flashing ON/OFF.
- The BUSS LED on the DMR-30 should be flashing ON/OFF.
- The INPUT LED should be flashing ON/OFF.
- Other LEDs on DMR-30 that may be illuminated:
 - BT1-05 (tilt)
 - BT2-01 (telescope interlock)
 - BT1-11 (lift interlock #1)
 - BT1-12 (lift interlock #2).

ENGINE START

- BT1-02 on DMR-30 (start) is illuminated when operating start switch.
- The hour meter should flash.
- BT4-08 (oil pressure input) will illuminate while engine is running.

NOTE: If no oil pressure is detected, ignition signal is deactivated. The engine will not continue to run.

GLOW PLUG (DIESEL)

- BT1-08 on DMR-30 is illuminated.
- Glow plugs are automatic.

BOOM

Speed control knob in UPPER control box must be turned past 5 to operate.

BOOM UP

- Function enable is pushed.
- LEDs on DMR-30 are illuminated:
 - BT1-03 (chassis selected)
 - BT2-04 (lift input)
 - BT5-09 (lift output to valve)
 - BT6-12 (low flow output)
 - BT5-06 (throttle output).

BOOM DOWN

- Function enable pushed.
- LEDs on DMR-30 illuminated:
 - BT1-03 (chassis selected)
 - BT2-05 (boom down input)
 - BT6-04 (boom down output to valve)
 - BT6-12 (low flow output)
 - BT5-06 (mid throttle output).

BOOM RISER UP

- Function enable pushed.
- LEDs on DMR-30 illuminated:
 - BT1-03 (chassis selected)
 - BT2-02 (riser up input)
 - BT5-12 (riser up to valve output)
 - BT6-10 (high flow output to valve)
 - BT5-06 (throttle output).

BOOM RISER LOWER

- Function enable pushed.
- LEDs on DMR-30 illuminated:
 - BT2-03 (riser lower input)
 - BT6-01 (riser lower output)
 - BT6-10 (high flow output to valve)
 - BT5-06 (throttle output).

BOOM EXTEND

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-06 (boom extend input)
 - BT6-07 (boom extend output to valve)
 - BT6-10 (high flow output)
 - BT5-06 (throttle output)

BOOM RETRACT

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-07 (boom retract input)
 - BT6-08 (boom retract output to valve)
 - BT6-10 (high flow output)
 - BT-06 (throttle output)

TURRET ROTATE**SWING RIGHT**

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-09 (swing right input)
 - BT7-09 (turret valve output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output).

SWING LEFT

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-08 (swing left input)
 - BT7-08 (turret valve output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow output).

JIB**JIB UP**

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-10 (jib up input)
 - BT7-06 (jib up output to valve)
 - BT6-12 (low flow valve output)
 - BT5-06 (throttle output).

JIB DOWN

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-11 (jib down input)
 - BT7-07 (jib down output to valve)
 - BT6-12 (low flow valve output)

- BT5-06 (throttle output).

CAGE ROTATE

CAGE RIGHT

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT4-03 (cage right input)
 - BT7-03 (cage right output to valve)
 - BT6-12 (low flow valve output)
 - BT5-06 (throttle output).

CAGE LEFT

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT4-02 (cage left input)
 - BT7-04 (cage left output to valve)
 - BT6-12 (low flow valve output)
 - BT5-06 (throttle output).

CAGE TRIM UP

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT2-12 (cage trim up input)
 - BT6-05 (cage trim up output to valve)
 - BT6-12 (low flow valve output)
 - BT5-07 (throttle output).

CAGE TRIM DOWN

- Function enabled.
- LEDs on DMR-30 illuminated:
 - BT4-01 (cage trim down input)
 - BT6-06 (cage trim down output to valve)
 - BT6-12 (low flow valve output)
 - BT5-07 (throttle output).

AUXILIARY POWER (EMERGENCY FUNCTIONS)

- Both Emergency Stops are pulled out (upper and lower).
- Auxiliary Switch enabled.
- Relay #9 activated (12 volts at relay #9, terminals #30 & #87).

NOTE: If the auxiliary switch is depressed when the engine is running, the engine will stop immediately.

UPPER CONTROL BOX

POWER-UP

- Both Emergency Stops are pulled out (upper and lower).
- Lower Control Box key switch in PLATFORM position. Platform key switch on.
- LEDs on DMR-30 illuminated:
 - BT1-01 (platform selected)
- LEDs on DMT-30 illuminated:
 - BT1-11 & BT1-12 (limit switch)
 - BT1-05 (tilt)

ENGINE START

- Operate start switch.
- LED's on DMR-30 illuminated:
 - BT3-03 (start input).
- LEDs on DMT-30 illuminated:
 - BT5-11 (starter output)
 - BT5-08 (glow plug output-diesel only)
 - BT4-04 (oil pressure)

BOOM LIFT FUNCTION

RISER UP

- Function enabled - foot switch depressed.
- LEDs on DMR-30 illuminated:
 - BT5-12 (riser up output)
 - BT5-06 (throttle output)
 - BT6-10 (high flow valve output).
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot switch), BT 3-09 (riser up).

RISER DOWN

- Function enabled - foot switch depressed.
- LED's on DMR-30 illuminated:
 - BT6-01 (riser down output)
 - BT5-06 (throttle output)
 - BT6-10 (high flow valve output)
- LED's on DMT-30 illuminated:
 - BT4-03 (foot switch)
 - BT 4-08 (riser down)

BOOM UP

- Function enabled - foot switch depressed.
- LED's on DMR-30 illuminated:
 - BT5-09 (boom up output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-09 (boom up)

BOOM DOWN

- Function enabled - foot switch depressed.
- LED's on DMR-30 illuminated:
 - BT5-04 (boom down output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-04 (boom down)

BOOM EXTEND

- Function enabled - foot switch depressed.
- LEDs on DMR-30 illuminated:
 - BT6-07 (boom extend output)
 - BT5-06 (throttle output)
 - BT6-10 (high flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT3-11 (boom extended)

BOOM RETRACT

- Function enabled - foot switch depressed.
- LEDs on DMR-30 illuminated:
 - BT6-08 (boom retract output)
 - BT5-06 (throttle output)
 - BT6-10 (high flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT3-06 (boom retract).

TURRET ROTATE FUNCTIONS**SWING RIGHT**

- Function enabled - foot switch depressed.
- LEDs on DMR-30 illuminated:
 - BT7-09 (turret rotate right output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output).
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT3-07 (turret rotate right)

SWING LEFT

- Function enabled - foot switch depressed.
- LEDs on DMR-30 illuminated:
 - BT7-08 (turret rotate left output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT3-01 (turret rotate left)

JIB FUNCTIONS

JIB UP

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT7-06 (jib up output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output).
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-07 (jib up)

JIB DOWN

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT7-07 (jib down output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-02 (jib down)

CAGE ROTATE

CAGE RIGHT

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT7-03 (cage rotate right output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output).
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-01 (cage rotate right)

CAGE LEFT

- Function enabled - foot pedal depressed.
- LEDs on DMR-30 Illuminated:
 - BT7-04 (cage rotate left output)
 - BT5-06 (throttle output)
 - BT6-12 (low flow valve output).
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-12 (cage rotate left)

CAGE TRIM UP

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT6-05 (cage trim up output)
 - BT5-06 (throttle output)
- BT6-12 (low flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-11 (cage trim up)

CAGE TRIM DOWN

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT6-06 (cage trim down valve)
 - BT5-06 (throttle output)
- BT6-12 (low flow valve output)
- LEDs on DMT-30 illuminated:
 - BT4-03 (foot pedal)
 - BT4-06 (cage trim down)

AUXILIARY POWER (EMERGENCY FUNCTIONS)

- DMR-30 BT5-10 (auxiliary output)
- DMT-30 BT3-08 (auxiliary power)

NOTE: If the auxiliary switch is depressed when the engine is running, the engine will stop immediately.

DRIVE FUNCTIONS

Drive functions are relayed to the drive pump from the joystick control. All adjustments are made at the joystick controller. Brake release and throttle commands are relayed from the joystick controller to the DMT-30 on BT3-08 (JSA) Joystick actuator.

DRIVE FORWARD

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT5-06 (throttle output)
 - BT5-04 (brake release)
- LEDs on DMT-30 Illuminated:
 - BT3-02 (JSA) joystick actuator

DRIVE REVERSE

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT5-06 (throttle output)
 - BT5-04 (brake release)
- LEDs on DMT-30 Illuminated:
 - BT3-02 (JSA) joystick actuator

STEER RIGHT

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT5-06 (throttle output)
 - BT6-10 (high flow valve)
 - BT7-02 (steer right output)
- LEDs on DMT-30 Illuminated:
 - BT4-05 on DMT-30 (steer right)

STEER LEFT

- Function enabled - foot switch depressed.
- LEDs on DMR-30 Illuminated:
 - BT5-06 (throttle output)
 - BT6-10 (high flow valve)
 - BT7-01 (steer left output)
- LEDs on DMT-30 Illuminated:
 - BT4-10 (steer left)

HIGH TORQUE POSITION

- No signal on DMR-30 or DMT-30.

HIGH SPEED POSITION

- LEDs on DMR-30 Illuminated:
 - BT3-10 (high speed)
 - LEDs on DMT-30 Illuminated:
 - BT5-07 (shift)
-

BRAKING

- Brakes are normally locked when the machine is not in use.
 - Brakes are unlocked by a charge pressure 26,2 bar (380 PSI) from the drive pump.
 - A 12 volt signal is sent to the brake solenoid by BT5-04 on DMR-30.
-

TILT

- A 12 volt signal is at BT1-05 (tilt signal input) when the machine is level.
 - If the machine is out of level or the level sensor fails, the machine will stop.
 - Red wire on level sensor is power in, and white wire is signal out.
-

INTERLOCKS

There are two interlocks on the machine.

1. Lift Interlock:
 - A 12 Volt signal is sent to BT2-01 on DMR-30;
 - allows high speed travel.
2. Telescope interlock (at tail end of boom):
 - A 12 volt signal is sent to BT1-11 & BT1-12 on DMR-30 when boom is fully retracted;
 - allows high speed travel.

3-8 OPTIMIZER SETTINGS AND SEQUENCE

The AB62 uses a Digital Multiplex Receiver (DMR-30) system manufactured by OEM to control the proportionality of boom functions. There is a transmitter (DMT-30) in the upper control box that takes the operator's control inputs and relays them to the receiver, via data link (two wires). The Optimizer can be plugged into the upper control box, with the use of an adapter (part #100329-005), or directly to the DMR-30 in the lower control box on port P-8. Remove the existing plug on P-8 to access port.

The AB62 uses two groups of settings: “**High Flow**,” which pertains to the BOOM RISER, BOOM EXTEND and STEER functions and the “**Low Flow**,” pertaining to the BOOM RAISE, JIB, TURRET ROTATE, and CAGE LEVEL functions. CAGE ROTATE is also altered by adjusting the flow control valve, located on the bottom of the valve block below the cage rotate valve. All settings correspond with how all the functions in that particular group will react to the rheostat control on the upper control box. Each adjustment will affect that whole group. For example: setting high flow, will change the threshold on boom riser, extend and steer. It is important not to deviate very far from the listed settings. Before making any changes, record the current settings. This will help to diagnose an existing or potential problem with a function on the machine.

- Make all settings only in the order in which they are displayed.
- Max Out or MX pertains to the extension of the cylinders in the group.
- Low Range or LR pertains to the retraction of the cylinders in the group.

SEQUENCE

- Emergency stop switches must be pulled and ignition switches on. It is not necessary to have the engine running when retrieving the initial settings or resetting the DMR-30.
- Plug the Optimizer in at either location and it should read “Run mode normal functions off.”
 - If not, ensure that all switches are on and the Optimizer is plugged into P-8. If plugged into the upper control box, ensure that there is a four-wire plug in P-8 port in the lower control box.
- **Low Flow:** Select THRESHOLD by pushing the threshold button. The preset value will appear.
 - If it needs to be changed, use the + or - to raise or lower the value. Continue to MAXOUT and so on until all low flow ranges are set, then push ENTER to save changes.
- **High flow:** Push ENTER, then + (readout will say ERROR): push + again, high flow will appear. Push ENTER. The TH, MX, RU, RD, LR icons will appear and TH will be flashing.
 - Push ENTER and the display will read: CHANGE; YES = + NO = ENTER.
 - Push + and the preset value will be displayed. To adjust, push + to raise value or - to lower value.
 - If preset value is correct or after resetting the value, push ENTER. You will be back to Run mode, normal functions off. To reset the other functions, repeat the procedure until TH is flashing, as it did above, then use the + or - to scroll to other functions; then continue.

IMPORTANT: After making changes, thoroughly test all functions for smoothness and proper operation.

SETTINGS

Low Flow System

Threshold . . . 28-30%
 High Range . . 56-58%
 Ramp Up 2 Sec.
 Ramp Down . . 0 Sec.
 Low Range . . 46-48%

High Flow System

Threshold 27-29%
 High Range95%
 Ramp Up 2 Sec.
 Ramp Down 0 Sec.
 Low Range95%

3-9 HYDRAULIC TROUBLESHOOTING

The AB62 has three independent hydraulic systems: one for drive; one for high flow lift functions; and one for low flow lift functions. The drive system uses an electrically controlled, variable displacement piston pump that powers four piston type wheel motors. The high flow system uses a gear type pump to power riser up/down, boom extend/retract, and steer functions. The low flow system, also using a gear type pump, operates Boom up/down, Jib up/down, Swing right/left, Cage rotate and Cage level.

High flow and low flow system pressures can be verified by connecting a 207 bar (**3000 PSI**) gauge to the upper port on the valve block. Operate Riser down to test high flow system or Jib up to test the low flow system. Operate function until it stops and system bypasses.

The high flow relief valve is located just below the gauge port.

- High flow pressure, 186 bar (**2700 PSI**).

The low flow relief valve is located below the high flow relief valve.

- Low flow pressure, 97 bar (**1400 PSI**).

W A R N I N G

Counterbalance valves must never be removed if the platform is raised and hydraulic system is under pressure. Be sure the platform is completely stowed before removing counterbalance valves.

3-10 ELECTRICAL TRUTH TABLE - AB62 GAS/LPG

COMPONENT		FUNCTION	ENGINE START/RUN UPPER CONTROLS	ENGINE START/RUN LOWER CONTROLS	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	RISER RAISE/LOWER	BOOM UP/DOWN	BOOM EXTEND/RETRACT	DRIVE FORWARD/REVERSE	SPEED HIGH/CREEP	STEER LEFT/RIGHT	JIB UP/DOWN	BATTERY CHARGE	PLATFORM LEVEL UP/DOWN	PLATFORM ROTATE CW/CCW	FRONT AXLE LOCK	TILT LIGHT	TURRET ROTATE	PARKING BRAKE RELEASE	TILT ALARM	TORQUE HIGH/LOW	EMERGENCY LOWERING	HORN	DRIVING LIGHTS - OPTIONAL	GENERATOR - OPTIONAL
ACT1	Throttle Actuator		X	X																						X
ALM1	Alarm, Tilt																				X					
ALT	Alternator		X	X										X												
BAT1	Battery, Engine Start		X	X																						
BAT2	Battery, Auxiliary Power																						X			
CB1	Circuit Breaker (20 AMP)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CB2	Circuit Breaker (10 AMP)		X		X					X	X	X								X		X	X	X		X
CB3	Circuit Breaker (10 AMP)									X	X	X								X				X	X	X
CONT1	Controller, DMR-30		X	X	X	X	X	X			X	X	X		X	X	X	X	X	X	X	X	X			X
D1	Diode, Auxiliary Power																						X			
D3	Diode, Power to platform		X		X					X	X	X									X			X		
D4	Diode																						X			
D5	Diode, Auxiliary Pump Relay																						X			
D6	Diode																						X			
D7	Diode, Alternator													X												
DIST	Distributor		X	X																						
FU1	Fuse (175 AMP)																						X			
FU2	Fuse (15 AMP) Engine Power		X	X																						
HORN	Horn																							X		
ISO	Charge Isolator													X												
Lamp1	Distress Lamp		X	X																						
Lamp2	Tilt lamp																	X			X					
LS1	Linkage Limit Switch										X						X	X			X					
LS2	Proximity Switch										X						X	X			X					
MOT1	Auxiliary Pump Motor																						X			
MOT2	Engine Start Motor		X	X																						
MTR1	Engine Temperature Meter		X	X																						
MTR2	Oil Pressure Meter		X	X																						
MTR3	Hour Meter																									
PMP1	Drive Pump									X	X															
R1	Engine Start Relay		X	X																						
R2	Fuel Select Relay		X	X																						
R3	Engine Relay		X	X																						
R4	LPG Relay		X	X																						
R5	Drive Motion Alarm									X																
R6	Gas Valve Relay		X	X																						
R7	Propane Valve Relay		X	X																						
R8	Left Axle Release																X									
R9	Right Axle Release																X									
R10	Axle Release Signal																X									
R11	Power to DMR-30 Relay		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X

COMPONENT		FUNCTION	ENGINE START/RUN UPPER CONTROLS	ENGINE START/RUN LOWER CONTROLS	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	RISE RAISE/LOWER	BOOM UP/DOWN	BOOM EXTEND/RETRACT	DRIVE FORWARD/REVERSE	SPEED HIGH/CREEP	STEER LEFT/RIGHT	JIB UP/DOWN	BATTERY CHARGE	PLATFORM LEVEL Up/Down	PLATFORM ROTATE CW/CCW	FRONT AXLE LOCK	TILT LIGHT	TURRET ROTATE	PARKING BRAKE RELEASE	TILT ALARM	TORQUE HIGH/LOW	EMERGENCY LOWERING	HORN	DRIVING LIGHTS - OPTIONAL	GENERATOR - OPTIONAL
R12	Auxiliary Pump																						X			
R13	Relay, Ignition cutout		X	X																						
R14	Drive Enable relay									X							X									
R15	Auxiliary Pump Motor Relay																						X			
SW1	Emergency Stop Switch		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SW2	Ignition Switch		X		X					X	X	X						X		X		X		X		X
SW4	Auxiliary Power Switch (Upper)				X																		X			
SW5	Generator Switch (Upper)				X																					X
SW6	Drive Hi/Lo Switch (Upper)				X																	X				
SW7	Cage Level Switch (Upper)				X										X											
SW8	Boom Up/Down Switch (Upper)				X			X																		
SW9	Turret Rotate (Upper)				X														X							
SW10	Cage Rotate (Upper)				X											X										
SW11	Jib Up/Down (Upper)				X								X													
SW12	Riser Up/Down (Upper)				X		X																			
SW13	Boom Retract/Extend (Upper)				X				X																	
SW14	Driving Lights (Upper)				X																				X	
SW17	Oil Pressure Switch		X	X										X												
SW18	Horn (Upper)				X																			X		
SW19	Foot Interlock (Upper)				X					X		X														
SW21	Emergency Stop (Lower)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SW22	Selector Switch (Lower)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SW23	Auxiliary Power Switch (Lower)																						X			
SW24	Enable Switch (Lower)					X																				
SW26	Boom Hi/Lo Speed (Lower)					X	X	X	X				X		X	X			X							
SW28	Engine Start Switch (Lower)			X																						
SW29	Turret Rotate (Lower)																									
SW30	Boom Up/Down Switch (Lower)					X		X																		
SW31	Cage Level Switch (Lower)					X									X											
SW32	Cage Rotate Switch (Lower)					X										X										
SW33	Jib Up/Down Switch (Lower)					X							X													
SW34	Riser Up/Down Switch (Lower)					X	X																			
SW35	Boom Extend/Retract (Lower)					X			X																	
SNSR1	Tilt Sensor																	X			X					
SNSR2	Engine Temperature Sensor		X	X																						
SNSR3	Engine Oil Pressure Sensor		X	X																						
SNSR4	Air Temperature EFI		X	X																						
SNSR5	Engine Temperature EFI		X	X																						
SOL1	Cage Level Up Solenoid															X										
SOL2	Cage Level Down Solenoid															X										
SOL3	Jib Up Solenoid												X													
SOL4	Jib Down Solenoid												X													
SOL5	Boom Up Solenoid							X																		
SOL6	Boom Down Solenoid							X																		

COMPONENT		FUNCTION	ENGINE START/RUN UPPER CONTROLS	ENGINE START/RUN LOWER CONTROLS	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	RISER RAISE/LOWER	BOOM UP/DOWN	BOOM EXTEND/RETRACT	DRIVE FORWARD/REVERSE	SPEED HIGH/CREEP	STEER LEFT/RIGHT	JIB UP/DOWN	BATTERY CHARGE	PLATFORM LEVEL UP/DOWN	PLATFORM ROTATE CW/CCW	FRONT AXLE LOCK	TILT LIGHT	TURRET ROTATE	PARKING BRAKE RELEASE	TILT ALARM	TORQUE HIGH/LOW	EMERGENCY LOWERING	HORN	DRIVING LIGHTS - OPTIONAL	GENERATOR - OPTIONAL
SOL7	Boom Extend Solenoid								X																	
SOL8	Boom Retract Solenoid								X																	
SOL9	Riser Up						X																			
SOL10	Riser Down						X																			
SOL11	Cage Rotate CW															X										
SOL12	Cage Rotate CCW															X										
SOL13	Turret Rotate CW																		X							
SOL14	Turret Rotate CCW																		X							
SOL15	Steer Right											X														
SOL16	Steer Left											X														
SOL17	Low Flow							X					X		X	X			X							
SOL18	High Flow						X		X			X							X							
SOL19	Generator Valve																									X
SOL20	Brake																									
SOL21	Torque																					X				
SOL22	Axle Lock																X									
TRANS	Transmitter, DMT-30	X		X								X										X				

3-11 ELECTRICAL TRUTH TABLE - AB62 DIESEL

COMPONENT		FUNCTION	FUNCTIONS																										
			ENGINE START/RUN	UPPER CONTROLS	ENGINE START/RUN	LOWER CONTROLS	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	RISER RAISE/LOWER	BOOM UP/DOWN	BOOM EXTEND/RETRACT	DRIVE FORWARD/REVERSE	SPEED HIGH/CREEP	STEER LEFT/RIGHT	JIB UP/DOWN	BATTERY CHARGE	PLATFORM LEVEL Up/Down	PLATFORM ROTATE CW/CCW	FRONT AXLE LOCK	TILT LIGHT	TURRET ROTATE	PARKING BRAKE RELEASE	TILT ALARM	TORQUE HIGH/LOW	EMERGENCY LOWERING	HORN	DRIVING LIGHTS - OPTIONAL	GENERATOR - OPTIONAL	THROTTLE CONTROLLER
ACT1	Throttle Actuator		X	X																								X	
ALM1	Alarm, Tilt																					X							
ALT	Alternator		X	X											X														
BAT1	Battery, Engine Start		X	X																									
BAT2	Battery, Auxiliary Power																								X				
CB1	Circuit Breaker (20 AMP)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
CB2	Circuit Breaker (10 AMP)		X		X					X	X	X									X			X	X	X			
CB3	Circuit Breaker (10 AMP)									X	X	X									X					X	X	X	
CONT1	Controller, DMR-30		X	X	X	X	X	X			X	X	X			X	X	X	X	X	X	X	X	X	X			X	
CONT2	Controller, Glow Plug		X	X																									
D1	Diode, Auxiliary Power																								X				
D3	Diode, Power to Platform		X		X					X	X	X									X				X				
D4	Diode																								X				
D5	Diode, Auxiliary Pump Relay																								X				
D6	Diode																							X					
D7	Diode, Alternator													X															
D8	Diode, Spike Protection																												
D9	Diode, Spike Protection																												X
FU1	Fuse (175 AMP)																								X				
HORN	Horn																									X			
ISO	Charge Isolator													X															
Lamp1	Distress Lamp		X	X																									
Lamp2	Tilt lamp																		X				X						
Lamp 3	Glow Plug Lamp		X	X																									
LS1	Linkage Limit Switch										X							X	X				X						
LS2	Proximity Switch										X							X	X				X						
MOT1	Auxiliary Pump Motor																								X				
MOT2	Engine Start Motor		X	X																									
MTR1	Engine Temperature Meter		X	X																									
MTR2	Oil Pressure Meter		X	X																									
MTR3	Hour Meter																												
PMP1	Drive Pump									X	X																		
R1	Engine Start Relay		X	X																									
R5	Drive Motion Alarm									X																			
R8	Axle Release, Left																	X											
R9	Axle Release, Right																	X											
R10	Axle Release Signal																	X											
R11	Power to DMR-30		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	
R12	Auxiliary Pump																								X				
R13	Ignition Cutout Relay		X	X																									
R14	Drive Enable Relay									X												X							

COMPONENT		FUNCTION	ENGINE START/RUN UPPER CONTROLS	ENGINE START/RUN LOWER CONTROLS	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	RISE RAISE/LOWER	BOOM UP/DOWN	BOOM EXTEND/RETRACT	DRIVE FORWARD/REVERSE	SPEED HIGH/CREEP	STEER LEFT/RIGHT	JIB UP/DOWN	BATTERY CHARGE	PLATFORM LEVEL Up/Down	PLATFORM ROTATE CW/CCW	FRONT AXLE LOCK	TILT LIGHT	TURRET ROTATE	PARKING BRAKE RELEASE	TILT ALARM	TORQUE HIGH/LOW	EMERGENCY LOWERING	HORN	DRIVING LIGHTS - OPTIONAL	GENERATOR - OPTIONAL	THROTTLE CONTROLLER
R15	Auxiliary Pump Motor Relay																						X				
SW1	Emergency Stop Switch		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SW2	Ignition Switch		X		X					X	X	X						X		X		X		X		X	
SW4	Auxiliary Power Switch (Upper)				X																		X				
SW5	Generator Switch (Upper)				X																				X		
SW6	Drive Hi/Lo Switch (Upper)				X																	X					
SW7	Cage Level Switch (Upper)				X										X												
SW8	Boom Up/Down Switch (Upper)				X			X																			
SW9	Turret Rotate (Upper)				X														X								
SW10	Cage Rotate (Upper)				X											X											
SW11	Jib Up/Down (Upper)				X								X														
SW12	Riser Up/Down (Upper)				X		X																				
SW13	Boom Retract/Extend (Upper)				X				X																		
SW14	Driving Lights (Upper)				X																				X		
SW17	Oil Pressure Switch		X	X										X													
SW18	Horn (Upper)				X																			X			
SW19	Foot Interlock (Upper)				X					X		X															
SW21	Emergency Stop (Lower)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
SW22	Selector Switch (Lower)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
SW23	Auxiliary Power Switch (Lower)																						X				
SW24	Enable Switch (Lower)					X																					
SW26	Boom Hi/Lo Speed (Lower)					X	X	X	X				X		X	X			X								
SW28	Engine start Switch (Lower)			X																							
SW29	Turret Rotate Switch (Lower)					X													X								
SW30	Boom Up/Down Switch (Lower)					X		X																			
SW31	Cage Level Switch (Lower)					X									X												
SW32	Cage Rotate Switch (Lower)					X										X											
SW33	Jib Up/Down Switch (Lower)					X							X														
SW34	Rise Up/Down Switch (Lower)					X	X																				
SW35	Boom Extend/Retract (Lower)					X			X																		
SNSR1	Tilt Sensor																	X			X						
SNSR2	Engine Temperature Sensor		X	X																							
SNSR3	Engine Oil Pressure Sensor		X	X																							
SOL1	Cage Level Solenoid														x												
SOL2	Cage Level Solenoid														x												
SOL3	Jib Up Solenoid												X														

COMPONENT		FUNCTION	FUNCTIONS																									
			ENGINE START/RUN UPPER CONTROLS	ENGINE START/RUN LOWER CONTROLS	UPPER CONTROL FUNCTIONS	LOWER CONTROL FUNCTIONS	RISE RAISE/LOWER	BOOM UP/DOWN	BOOM EXTEND/RETRACT	DRIVE FORWARD/REVERSE	SPEED HIGH/CREEP	STEER LEFT/RIGHT	JIB UP/DOWN	BATTERY CHARGE	PLATFORM LEVEL Up/Down	PLATFORM ROTATE CW/CCW	FRONT AXLE LOCK	TILT LIGHT	TURRET ROTATE	PARKING BRAKE RELEASE	TILT ALARM	TORQUE HIGH/LOW	EMERGENCY LOWERING	HORN	DRIVING LIGHTS - OPTIONAL	GENERATOR - OPTIONAL	THROTTLE CONTROLLER	
SOL4	Jib Down Solenoid											X																
SOL5	Boom Up Solenoid						X																					
SOL6	Boom Down Solenoid						X																					
SOL7	Boom Extend Solenoid							X																				
SOL8	Boom Retract Solenoid							X																				
SOL9	Riser Up					X																						
SOL10	Riser Down					X																						
SOL11	Cage Rotate CW														X													
SOL12	Cage Rotate CCW														X													
SOL13	Turret Rotate CW																	X										
SOL14	Turret Rotate CCW																	X										
SOL15	Steer Right										X																	
SOL16	Steer Left										X																	
SOL17	Low Flow						X					X		X	X			X										
SOL18	High Flow					X		X			X																	
SOL19	Generator Valve																								X			
SOL20	Brake								X																			
SOL21	Torque																				X							
SOL22	Axle Lock															X												
SOL23	Fuel	X	X																									
TMR	Timing Module	X	X																									
TRANS	Transmitter, DMT-30	X		X							X										X							

3-12 HYDRAULIC TRUTH TABLE - AB62

COMPONENT		FUNCTION	STEER	RISER ELEVATE/DESCEND	BOOM EXTEND/RETRACT	BOOM RAISE/LOWER	JIB UP/DOWN	CAGE LEVEL UP/DOWN	CAGE ROTATE CW/CCW	TURRET ROTATE CW/CCW	DRIVE FORWARD/REVERSE	FRONT AXLE LOCK	BRAKE RELEASE	EMERGENCY LOWER
CB1	Counterbalance Valve, Riser			X										
CB2	Counterbalance Valve, Boom Extend				X									
CB3	Counterbalance Valve, Boom Raise					X								
CB4	Counterbalance Valve, Jib Cylinder						X							
CB5	Counterbalance Valve, Master Cylinder							X						
CB6	Counterbalance Valve, Slave Cylinder							X						
CB7	Counterbalance Valve, Cage Rotate								X					
CB8	Counterbalance Valve, Turret Rotate									X				
CB9	Counterbalance Valve, Left Axle Cylinder											X		
CB10	Counterbalance Valve, Right Axle Cylinder											X		
CV1-2	High Pressure Test Port Check Valve													
CV3-7	Low Pressure Test Port Check Valve					X	X	X	X	X				
CV8	Boom Extend Cylinder Check Valve				X									
CV9	Turret Rotate Check Valve									X				
CYL1	Steer Cylinder		X											
CYL2	Riser Cylinder			X										
CYL 3	Boom Extend Cylinder				X									
CYL4	Boom Raise Cylinder					X								
CYL5	Jib Cylinder						X							
CYL6	Master Cylinder							X						
CYL7	Slave Cylinder							X						
CYL8	Turret Rotate Brake Cylinder									X				
CYL11	Left Axle Lock Cylinder											X		
CYL12	Right Axle Lock Cylinder											X		
FD1-2	Flow Divider										X			
FL1	Suction Filter										X	X	X	
FL2	Suction Filter		X	X	X	X	X	X	X	X				x
FL3	Return Filter													
MOT1	Left Rear Drive Motor										X			
MOT2	Right Front Drive Motor										X			
MOT3	Right Rear Drive Motor										X			
MOT4	Left Front Drive Motor										X			
ORF1	Turret Orifice									X				
ORF2	Riser Orifice			X										
ORF3-4	Drive Orifice										X			
PMP1	2 Stage Boom Pump		X	X	X	X	X	X	X	X				
PMP2	Variable Drive Pump										X	X	X	
PMP3	Auxiliary Pump													X
ROT	Cage Rotator								X					
RV1	Low Pressure Relief Valve					X	X	X	X	X				
RV2	High Pressure Relief		X	X	X									
RV3	Jib Cylinder Relief						X							
V1	Steering Valve		X											
V2	Riser Valve			X										
V3	Boom Extend Valve				X									

COMPONENT		FUNCTION	STEER	RISER ELEVATE/DESCEND	BOOM EXTEND/RETRACT	BOOM RAISE/LOWER	JIB UP/DOWN	CAGE LEVEL UP/DOWN	CAGE ROTATE CW/CCW	TURRET ROTATE CW/CCW	DRIVE FORWARD/REVERSE	FRONT AXLE LOCK	BRAKE RELEASE	EMERGENCY LOWER
V4	Boom Raise Valve					X								
V5	Jib Valve						X							
V6	Cage Level Valve							X						
V7	Turret Rotate Valve									X				
V8	Cage Rotate								X					
V9	Low Flow Valve					X	X	X	X	X				
V10	High Flow Valve		X	X	X									
V11	Diverter Valve													
V12	Brake Valve												X	
V13	Axle Float Valve											X		
V14	High Speed Valve										X			
V15	Rear Drive Torque/Speed Valve										X			
V16	Front Drive Torque/Speed Valve										X			

NOTES:

SCHEMATICS

This section contains electrical and hydraulic power schematics and associated information for maintenance purposes.

The diagrams are to be used in conjunction with the *Troubleshooting Truth Tables* in the Troubleshooting section. They allow understanding of the makeup and functions of the systems for checking, tracing, and fault finding during troubleshooting analysis.

The components that comprise the electrical and hydraulic systems are given a reference designation and are explained as to function and location in the following tables.

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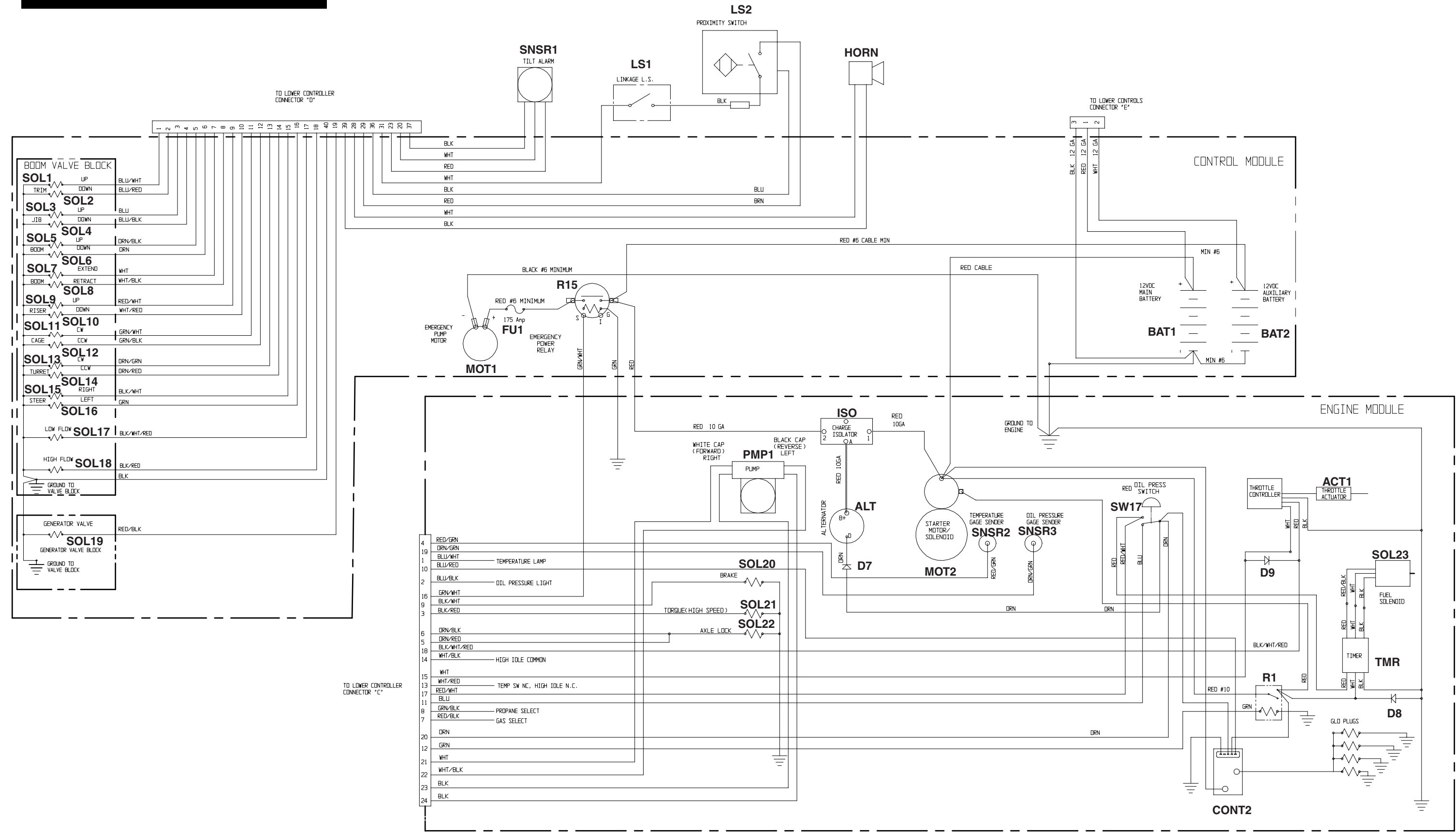
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4-1 ELECTRICAL SCHEMATIC - DIESEL

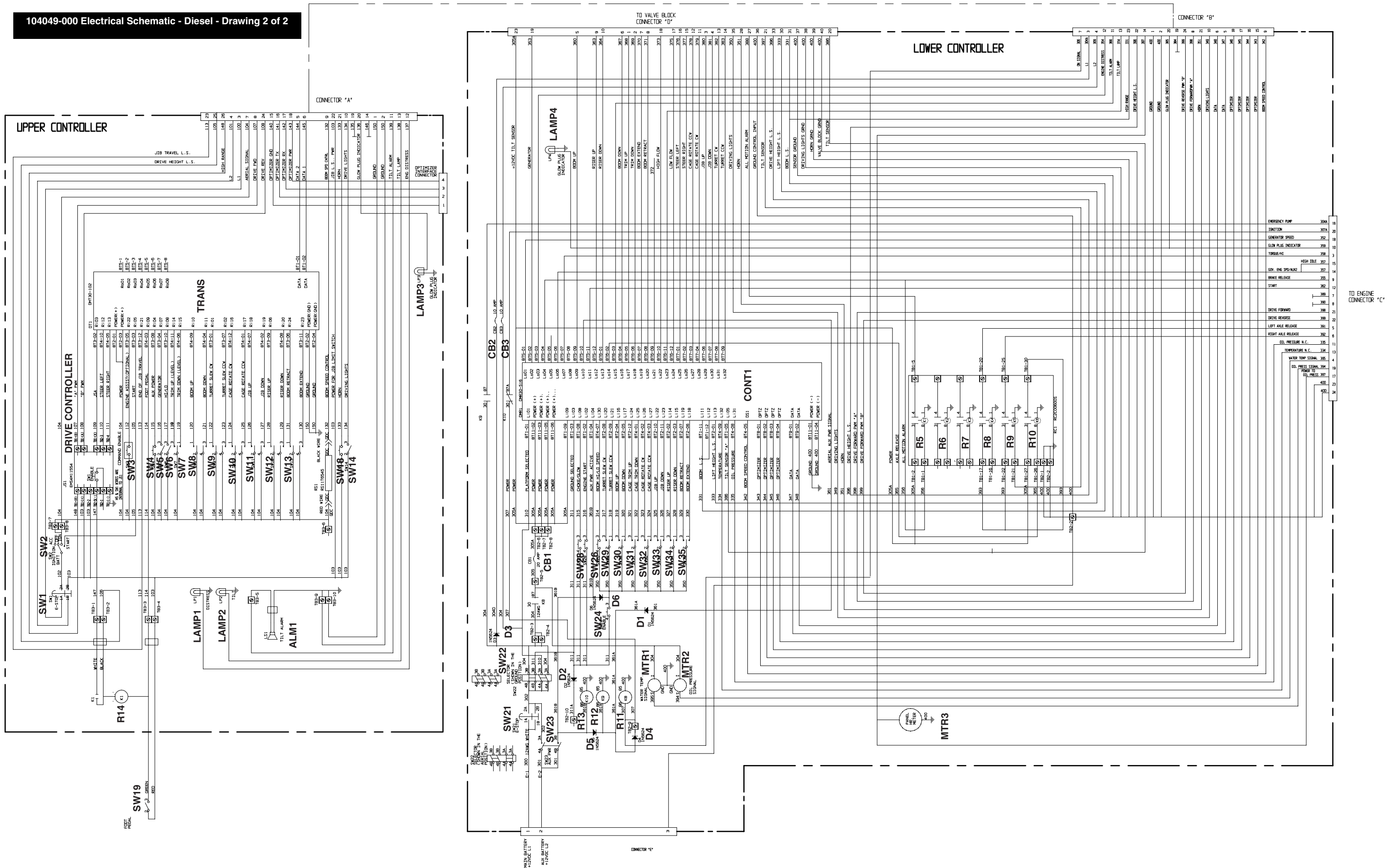
Legend: 104049-000 Electrical Schematic - Diesel

REFERENCE	NAME	FUNCTION	LOCATION	REFERENCE	NAME	FUNCTION	LOCATION
ACT1	Actuator	Throttle	Engine Module	SW5	Switch	Generator	Platform Control Box
ALM1	Alarm, Tilt	Provide warning sound when machine is off-level	Lower Control Box	SW6	Switch	Drive Hi/Low Speed	Platform Control Box
ALT	Alternator	Charge Battery	Engine	SW7	Switch	Level the Platform	Platform Control Box
BAT1	Battery	Start Engine	Under Hydraulic Block	SW8	Switch	Boom, Up/Down	Platform Control Box
BAT2	Battery	Auxiliary Power	Under Hydraulic Block	SW9	Switch	Turret Rotate	Platform Control Box
CB1	Circuit Breaker	Overload protection for DMR-30	Lower Control Box	SW10	Switch	Cage Rotate	Platform Control Box
CB2	Circuit Breaker	Overload protection Platform Control	Lower Control Box	SW11	Switch	Jib, Up/Down	Platform Control Box
CB3	Circuit Breaker	Overload protection Platform Accessories	Lower Control Box	SW12	Switch	Riser, Up/Down	Platform Control Box
CONT1	Controller, DMR-30	Controls machine functions	Lower Control Box	SW13	Switch	Boom, Retract/Extend	Platform Control Box
CONT2	Controller	Glow Plug Controller	Engine Module	SW14	Switch	Driving Lights	Platform Control Box
D1	Diode	Auxiliary Power from Platform	Lower Control Box	SW17	Switch	Oil Pressure Switch	Engine Module
D2	Diode	Not Used		SW18	Switch	Horn	Lower Control Box
D3	Diode	Power to Platform Controls	Engine Module	SW19	Switch	Interlock, Foot	Platform Control Box
D4	Diode	Prevents Auxiliary Pump operation when ignition is on	Lower Control Box	SW21	Switch	Emergency Stop	Lower Control Box
D5	Diode	Auxiliary Pump Relay Signal	Lower Control Box	SW22	Switch	Selector	Lower Control Box
D6	Diode	Auxiliary Power to Lower Controls	Lower Control Box	SW23	Switch	Auxiliary Power	Lower Control Box
D7	Diode	Alternator exciter signal	Engine, near Alternator	SW24	Switch	Enable	Lower Control Box
D8	Diode	Spike Protection Diode	Engine Module	SW26	Switch	Boom, Speed	Lower Control Box
D9	Diode	Spike Protection Diode	Engine Module	SW28	Switch, Ignition	Engine Start	Lower Control Box
FU1	Fuse	Auxiliary Power Motor	Control Module	SW29	Switch	Turret Rotate	Lower Control Box
HORN	Horn	Sound Alarm	Upper Control Box	SW30	Switch	Boom, Up/Down	Lower Control Box
ISO	Isolator	Charge Isolator	Engine	SW31	Switch	Level the Platform	Lower Control Box
Lamp1	Lamp	Distress, Engine	Upper Control Box	SW32	Switch	Cage Rotate	Lower Control Box
Lamp2	Lamp	Tilt	Upper Control Box	SW33	Switch	Jib, Up/Down	Lower Control Box
Lamp3	Lamp	Glow Plug	Upper Control Box	SW34	Switch	Riser, Up/Down	Lower Control Box
Lamp4	Lamp	Glow Plug	Lower Control Box	SW35	Switch	Boom, Extend/Retract	Lower Control Box
LS1	Limit Switch	Linkage Limit Switch	Lower Linkage Assy.	SNSR1	Sensor, Tilt	Activate tilt alarm. Disable all machine functions except Platform Lower when machine is more than 3° off level.	Control module
LS2	Limit Switch	Proximity Switch	Right side, rear of main Boom				
MOT1	Motor	Auxiliary Pump	Control Module	SNSR2	Sensor	Engine Temperature	Engine
MOT2	Motor	Start Engine	Engine	SNSR3	Sensor	Engine Oil Pressure	Engine
MTR1	Meter	Engine Temperature	Lower Control Box	SOL1	Solenoid	Trim, Up	Boom Valve Block
MTR2	Meter	Oil Pressure	Lower Control Box	SOL2	Solenoid	Trim, Down	Boom Valve Block
MTR3	Meter, Hour	Hours machine has operated.	Lower Control Box	SOL3	Solenoid	Jib, Up	Boom Valve Block
PMP1	Pump	Drive	Engine Module	SOL4	Solenoid	Jib, Down	Boom Valve Block
R1	Relay	Engine Start Relay	Engine Module	SOL5	Solenoid	Boom, Up	Boom Valve Block
R5	Relay	Drive Motion Alarm	Lower Control Box Strip	SOL6	Solenoid	Boom, Down	Boom Valve Block
R6	Relay	Not Used	Lower Control Box Strip	SOL7	Solenoid	Boom, Extend	Boom Valve Block
R7	Relay	Not Used	Lower Control Box Strip	SOL8	Solenoid	Boom, Retract	Boom Valve Block
R8	Relay	Left Axle Release	Lower Control Box Strip	SOL9	Solenoid	Riser, Up	Boom Valve Block
R9	Relay	Right Axle Release	Lower Control Box Strip	SOL10	Solenoid	Riser, Down	Boom Valve Block
R10	Relay	Axle Release Signal	Lower Control Box Strip	SOL11	Solenoid	Cage Rotate, CW	Boom Valve Block
R11	Relay	Power to DMR-30	Lower Control Box	SOL12	Solenoid	Cage Rotate, CCW	Boom Valve Block
R12	Relay	Auxiliary Pump Relay	Lower Control Box	SOL13	Solenoid	Turret Rotate, CW	Boom Valve Block
R13	Relay	Ignition cutout during Auxiliary Power	Lower Control Box	SOL14	Solenoid	Turret Rotate, CCW	Boom Valve Block
R14	Relay	Drive Enable	Platform Control Box	SOL15	Solenoid	Steer, Right	Boom Valve Block
R15	Relay	Auxiliary Pump Motor	Control Module	SOL16	Solenoid	Steer, Left	Boom Valve Block
SW1	Switch	Emergency Stop	Platform Control Box	SOL17	Solenoid	Low Flow Proportional	Boom Valve Block
SW2	Switch, Ignition	Start Engine	Platform Control Box	SOL18	Solenoid	High Flow Proportional	Boom Valve Block
SW3	Not Used			SOL19	Solenoid	Generator Valve	Gen Valve Block
SW4	Switch	Auxiliary Power	Platform Control Box	SOL20	Solenoid	Brake	Engine Module
				SOL21	Solenoid	Torque	Engine Module
				SOL22	Solenoid	Axle Lock	Engine Module
				SOL23	Solenoid	Fuel	Engine Module
				TMR	Timing Module	Fuel Solenoid Pull Circuit	Engine
				TRANS	Transmitter DMT-30	Transmit signal to controller	Platform Control Box

104049-000 Electrical Schematic - Diesel - Drawing 1 of 2



104045-001 - AB62 Work Platform



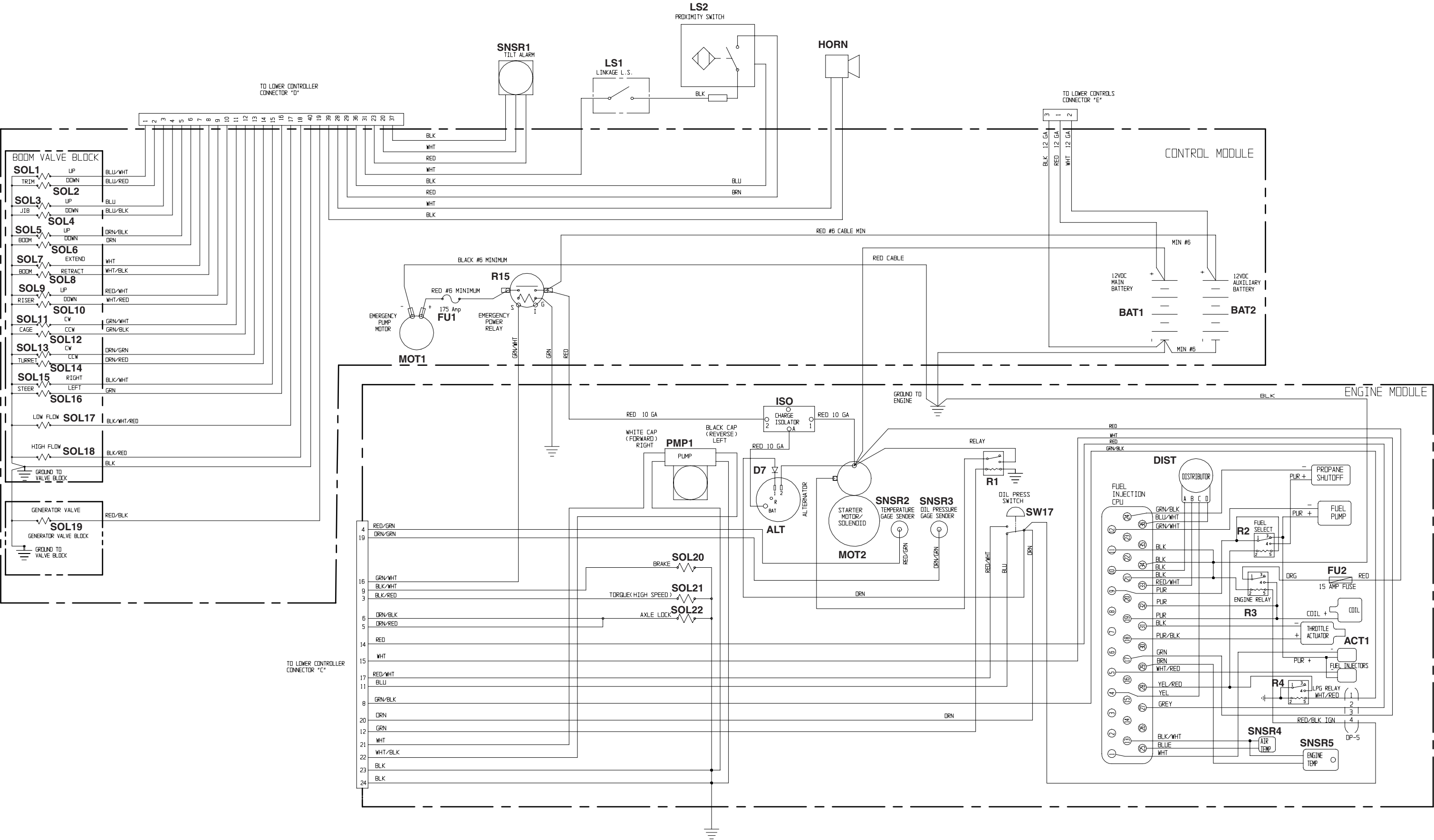
4-2 ELECTRICAL SCHEMATIC - GAS/LPG

Legend: 104049-001 Electrical Schematic - Gas/LPG

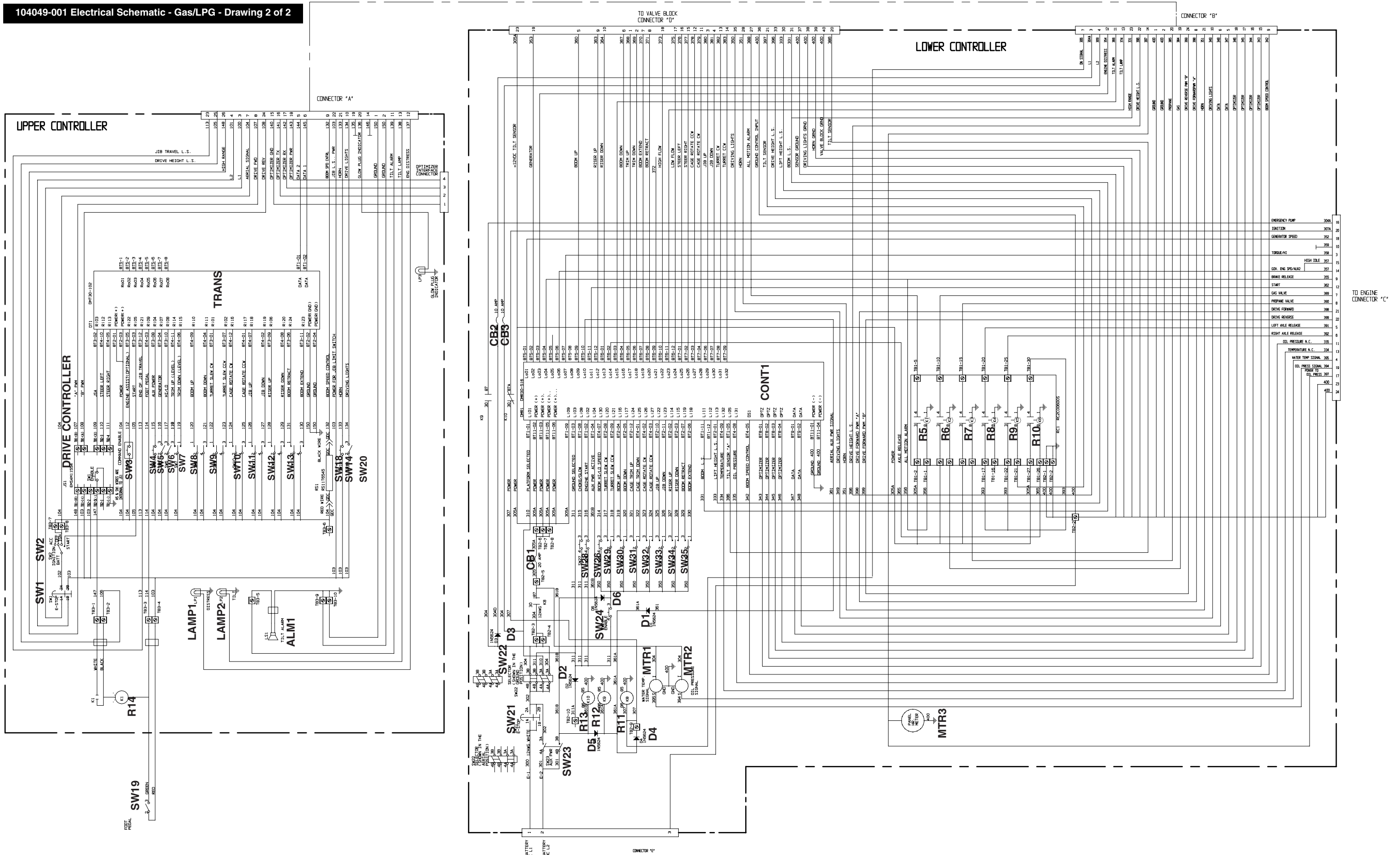
REFERENCE	NAME	FUNCTION	LOCATION
ACT1	Actuator	Throttle	Engine Module
ALM1	Alarm, Tilt	Provides warning sound when machine is off-level.	Lower Control Box
ALT	Alternator	Charge Battery	Engine
BAT1	Battery	Start Engine	Engine Module
BAT2	Battery	Auxiliary Power	Engine Module
CB1	Circuit Breaker	Overload protection	Lower Control Box
CB2	Circuit Breaker	Overload protection	Lower Control Box
CB3	Circuit Breaker	Overload protection	Lower Control Box
CONT1	Controller, DMR30	Controls machine functions	Lower Control Box
D1	Diode	Auxiliary power from Upper Controls	Lower Control Box
D2	Not Used		
D3	Diode	Power to Upper Controls	Lower Control Box
D4	Diode	Prevents Auxiliary Pump operation when ignition is on	Lower Control Box
D5	Diode	Auxiliary Pump relay signal	Lower Control Box
D6	Diode	Auxiliary power to Lower Controls	Lower Control Box
D7	Diode	Alternator exciter signal	Engine, near Alternator.
DIST	Distributor	Distributor	Engine
FU1	Fuse	Auxiliary pump fuse	Auxiliary pump
FU2	Fuse	Engine Starter	Engine
HORN	Horn	Sound Alarm	Upper Control Box
ISO	Isolator	Charge Isolator	Engine
Lamp1	Lamp	Distress, Engine	Upper Control Box
Lamp2	Lamp	Tilt	Upper Control Box
LS1	Limit Switch	Linkage Limit Switch	Lower Linkage Assy.
LS2	Limit Switch	Proximity Switch	Right side, rear of Main Boom
MOT1	Motor	Auxiliary Pump	Engine Module
MOT2	Motor	Start Engine	Engine Module
MTR1	Meter	Engine Temperature	Lower Control Box
MTR2	Meter	Oil Pressure	Lower Control Box
MTR3	Meter, Hour	Hours machine has operated	Lower Control Box
PMP1	Pump	Drive	Engine Module
R1	Relay	Start Relay	Engine Module
R2	Relay	Fuel Select	Engine Module
R3	Relay	Engine Relay	Engine Module
R4	Relay	LPG Relay	Engine Module
R5	Relay	Drive motion Alarm Relay	Lower Control Box Strip
R6	Relay	Gas valve Relay	Lower Control Box Strip
R7	Relay	Propane valve relay	Lower Control Box Strip
R8	Relay	Left axle release Relay	Lower Control Box Strip
R9	Relay	Right axle release Relay	Lower Control Box Strip
R10	Relay	Axle release signal Relay	Lower Control Box Strip
R11	Relay	Power to DMR30 Relay	Lower Control Box
R12	Relay	Auxiliary Pump Relay	Lower Control Box
R13	Relay	Ignition cutout during Auxiliary Power	Lower Control Box
R14	Relay	Drive Enable Relay	Platform Control Box
R15	Relay	Auxiliary Pump Motor Relay	Control Module
SW1	Switch	Emergency Stop	Platform Control Box
SW2	Switch, Ignition	Start Engine	Platform Control Box

REFERENCE	NAME	FUNCTION	LOCATION
SW3	Not Used		
SW4	Switch	Auxiliary Power	Platform Control Box
SW5	Switch	Generator	Platform Control Box
SW6	Switch	Drive Hi/Low Speed	Platform Control Box
SW7	Switch	Level the Platform	Platform Control Box
SW8	Switch	Boom, Up/Down	Upper Control Box
SW9	Switch	Turret Rotate	Upper Control Box
SW10	Switch	Cage Rotate	Upper Control Box
SW11	Switch	Jib, Up/Down	Upper Control Box
SW12	Switch	Riser, Up/Down	Upper Control Box
SW13	Switch	Boom, Retract/Extend	Upper Control Box
SW14	Switch	Driving Lights	Upper Control Box
SW17	Switch	Oil Pressure Switch	Engine
SW18	Switch	Horn	Upper Control Box
SW19	Switch	Interlock, Foot	Platform
SW20	Switch	Fuel Selector	Upper Control Box
SW21	Switch	Emergency Stop	Lower Control Box
SW22	Switch	Selector	Lower Control Box
SW23	Switch	Auxiliary Power	Lower Control Box
SW24	Switch	Enable	Lower Control Box
SW26	Switch	Boom, Hi/Lo Speed	Lower Control Box
SW28	Switch, Ignition	Engine Start	Lower Control Box
SW29	Switch	Turret Rotate	Lower Control Box
SW30	Switch	Boom, Up/Down	Lower Control Box
SW31	Switch	Level the Platform	Lower Control Box
SW32	Switch	Cage Rotate	Lower Control Box
SW33	Switch	Jib, Up/Down	Lower Control Box
SW34	Switch	Riser, Up/Down	Lower Control Box
SW35	Switch	Boom, Extend/Retract	Lower Control Box
SNSR1	Sensor, Tilt	Activate tilt alarm. Disable all machine functions except Platform Lower when machine is more than 3° off level.	Control module
SNSR2	Sensor	Engine Temperature	Engine
SNSR3	Sensor	Engine Oil Pressure	Engine
SNSR4	Sensor	Air Temperature EFI	Engine
SNSR5	Sensor	Engine Temperature EFI	Engine
SOL1	Solenoid	Trim, Up	Boom Valve Block
SOL2	Solenoid	Trim, Down	Boom Valve Block
SOL3	Solenoid	Jib, Up	Boom Valve Block
SOL4	Solenoid	Jib, Down	Boom Valve Block
SOL5	Solenoid	Boom, Up	Boom Valve Block
SOL6	Solenoid	Boom, Down	Boom Valve Block
SOL7	Solenoid	Boom, Extend	Boom Valve Block
SOL8	Solenoid	Boom, Retract	Boom Valve Block
SOL9	Solenoid	Riser, Up	Boom Valve Block
SOL10	Solenoid	Riser, Down	Boom Valve Block
SOL11	Solenoid	Cage Rotate, CW	Boom Valve Block
SOL12	Solenoid	Cage Rotate, CCW	Boom Valve Block
SOL13	Solenoid	Turret Rotate, CW	Boom Valve Block
SOL14	Solenoid	Turret Rotate, CCW	Boom Valve Block
SOL15	Solenoid	Steer, Right	Boom Valve Block
SOL16	Solenoid	Steer, Left	Boom Valve Block
SOL17	Solenoid	Low Flow Proportional	Boom Valve Block
SOL18	Solenoid	High Flow Proportional	Boom Valve Block
SOL19	Solenoid	Generator Valve	Gen Valve Block
SOL20	Solenoid	Brake	Engine Module
SOL21	Solenoid	Torque	Engine Module
SOL22	Solenoid	Axle Lock	Engine Module
TRANS	Transmitter	Transmit signal to Controller	Upper Control Box

104049-001 Electrical Schematic - Gas/LPG - Drawing 1 of 2



104049-001 Electrical Schematic - Gas/LPG - Drawing 2 of 2



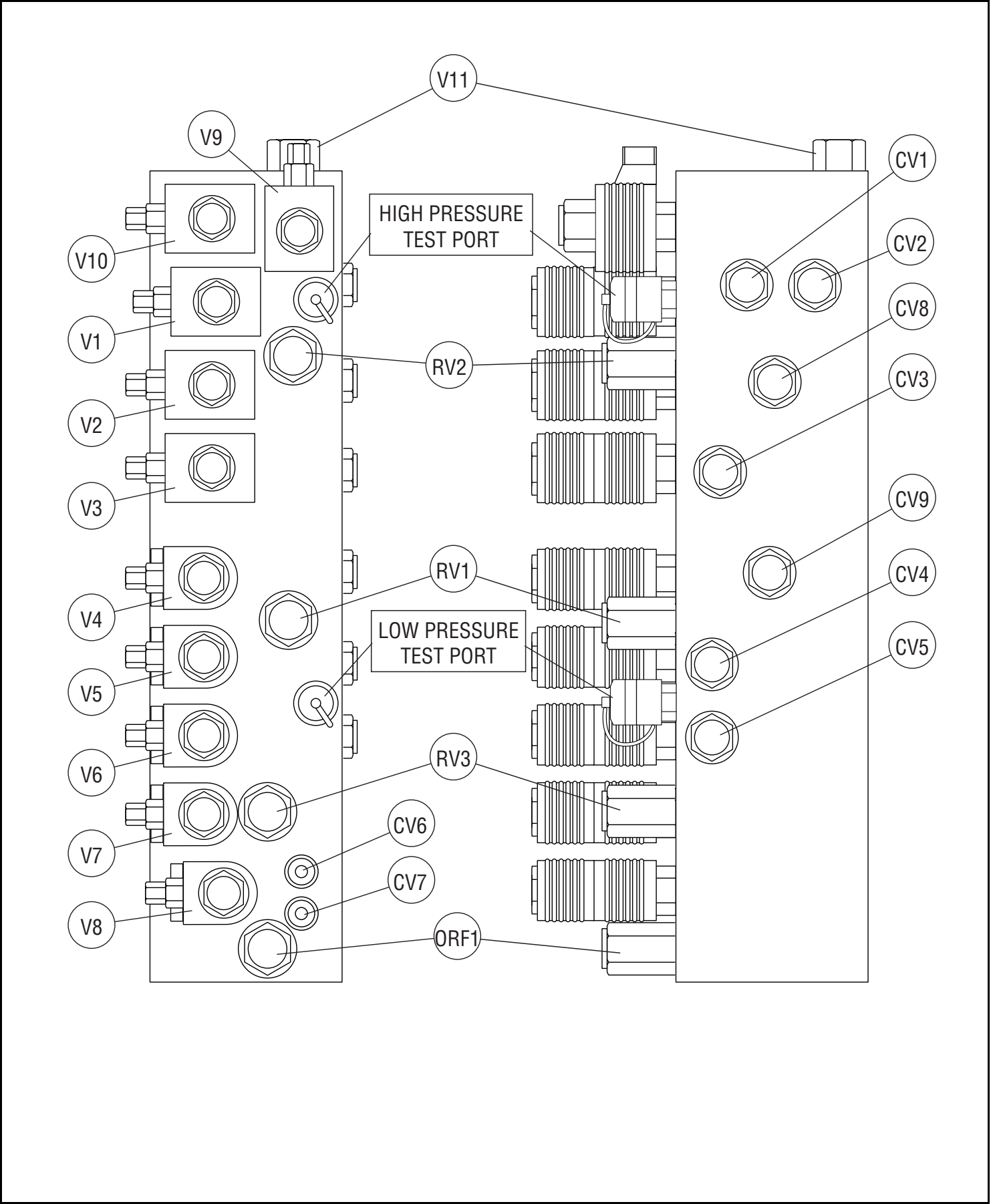
4-3 HYDRAULIC SCHEMATIC

Legend: 104048-011 Hydraulic Schematic

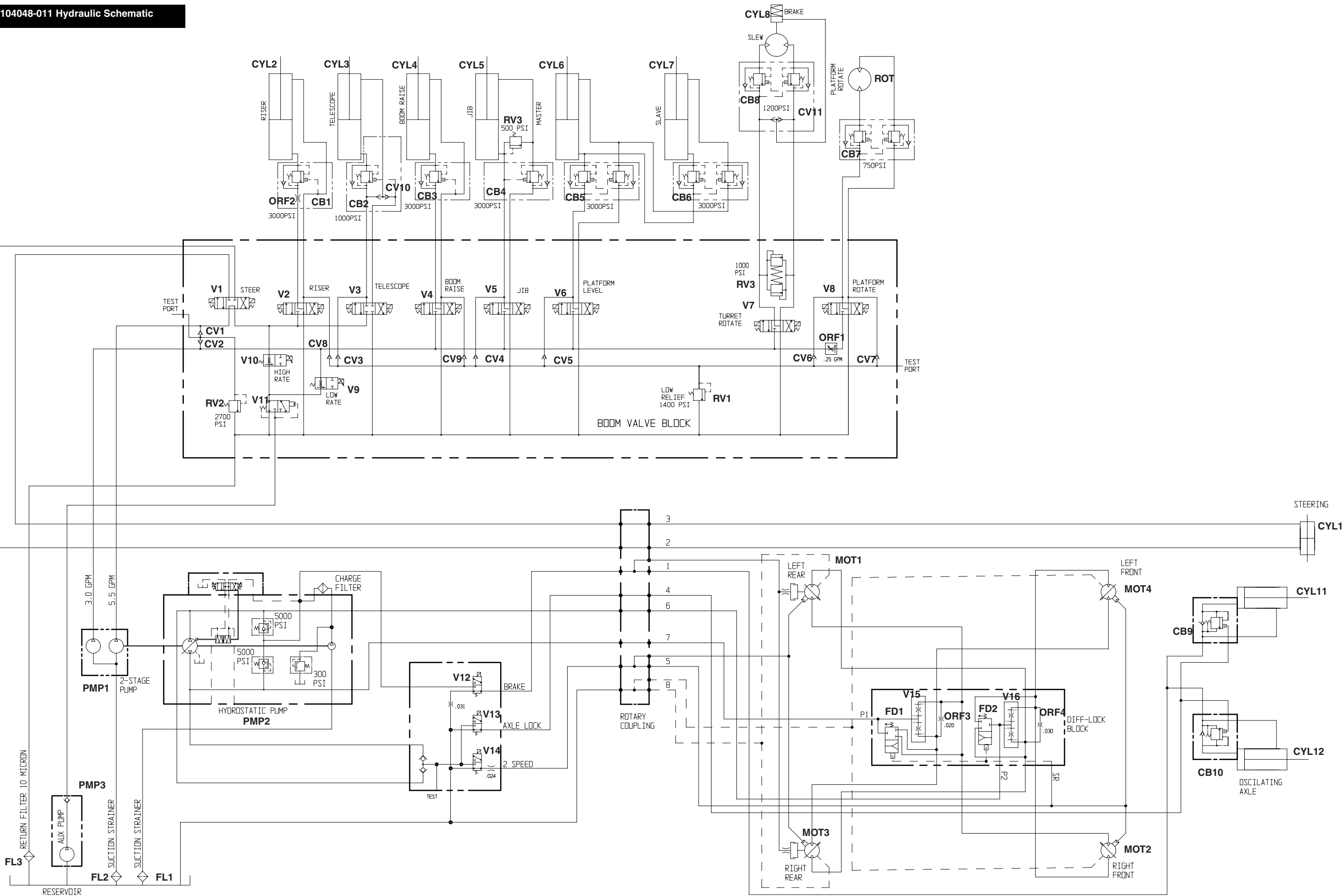
REFERENCE	NAME	FUNCTION	LOCATION
CB1	Counterbalance Valve	Riser Counterbalance	Riser Cylinder
CB2	Counterbalance Valve	Boom Extend Counterbalance	Boom Extend Cylinder
CB3	Counterbalance Valve	Boom Raise Counterbalance	Boom Raise Cylinder
CB4	Counterbalance Valve	Jib Counterbalance	Jib Cylinder
CB5	Counterbalance Valve	Master Counterbalance	Master Cylinder
CB6	Counterbalance Valve	Slave Counterbalance	Slave Cylinder
CB7	Counterbalance Valve	Cage Rotate Counterbalance	Cage Rotate Valve Block
CB8	Counterbalance Valve	Turret Rotate Counterbalance	Turret Rotate Motor
CB9	Counterbalance Valve	Left Axle Counterbalance	Left AXle Lock Cylinder
CB10	Counterbalance Valve	Right Axle Counterbalance	Right Axle Lock Cylin-der
CV1&2	Check Valve	High Pressure Test Port Check Valve	Main Valve Block
CV3-9	Check Valve	Low Pressure Test Port Check Valves	Main Valve Block
CV10	Check Valve	Boom Extend Cylinder Check Valve	Boom Extend Cylinder
CV11	Check Valve	Turret Rotate Check Valve	Turret Rotate Valve Block
CYL1	Cylinder	Steering Cylinder	Chassis
CLY2	Cylinder	Riser Cylinder	Riser
CYL3	Cylinder	Boom Extend Cylinder	Inside Boom
CYL4	Cylinder	Boom Raise Cylinder	Front of Boom
CYL5	Cylinder	Jib Cylinder	Jib
CYL6	Cylinder	Master Cylinder	Rear of Boom
CYL7	Cylinder	Slave Cylinder	Front of Boom
CYL8	Cylinder	Turret Rotate Brake Cylinder	Turret Rotate Motor
CYL11	Cylinder	Left Axle Lock Cylinder	Front Axle
CYL12	Cylinder	Right Axle Lock Cylinder	Front Axle
FD1-2	Flow Divider	Flow Divider	Drive Valve Block

REFERENCE	NAME	FUNCTION	LOCATION
FL1	Filter	Suction Filter	Tank
FL2	Filter	Suction Filter	Tank
FL3	Filter	Return Filter	Tank
MOT1	Drive Motor	Left Rear Drive Motor	Left Rear Axle
MOT2	Drive Motor	Right Front Drive Motor	Right Front Axle
MOT3	Drive Motor	Right Rear Drive Motor	Right Rear Axle
MOT4	Drive Motor	Left Front Drive Motor	Left Front Axle
ORF1	Orifice	Limit Turret Rotate Speed	Main Valve Block
ORF2	Orifice	Limit Riser down speed	Riser Cylinder
ORF3 & 4	Orifice	Limit Flow Between Front and Rear Drive Motors	Drive Valve Block
PMP1	Pump	Two Stage Pump	Engine Module
PMP2	Pump	Variable Drive Pump	Engine Module
PMP3	Pump	Auxiliary Pump	Engine Module
ROT	Rotator	Cage Rotator	Platform
RV1	Relief Valve	Low Pressure Relief	Main Valve Block
RV2	Relief Valve	High Pressure Relief	Boom Valve Block
RV3	Relief Valve	Slew Relief	Main Valve Block
RV4	Relief Valve	Jib Cylinder Relief	Jib Cylinder
V1	Valve	Steer Valve	Main Valve Block
V2	Valve	Riser Valve	Main Valve Block
V3	Valve	Boom Extend Valve	Main Valve Block
V4	Valve	Boom Raise Valve	Main Valve Block
V5	Valve	Jib Valve	Main Valve Block
V6	Valve	Cage Level	Main Valve Block
V7	Valve	Turret Rotate	Main Valve Block
V8	Valve	Cage Rotate	Main Valve Block
V9	Valve	Low Flow Valve	Main Valve Block
V10	Valve	High Flow Valve	Main Valve Block
V11	Valve	Diverter Valve	Main Valve Block
V12	Valve	Brake Valve	Brake, Axle Lock, 2-Speed Valve Block
V13	Valve	Axle Float Valve	Brake, Axle Lock, 2-Speed Valve Block
V14	Valve	High Speed Valve	Brake, Axle Lock, 2-Speed Valve Block
V15	Valve	Rear Drive Valve	Drive Valve Block
V16	Valve	Front Drive Valve	Drive Valve Block

104525-000 VALVE MANIFOLD ASSEMBLY

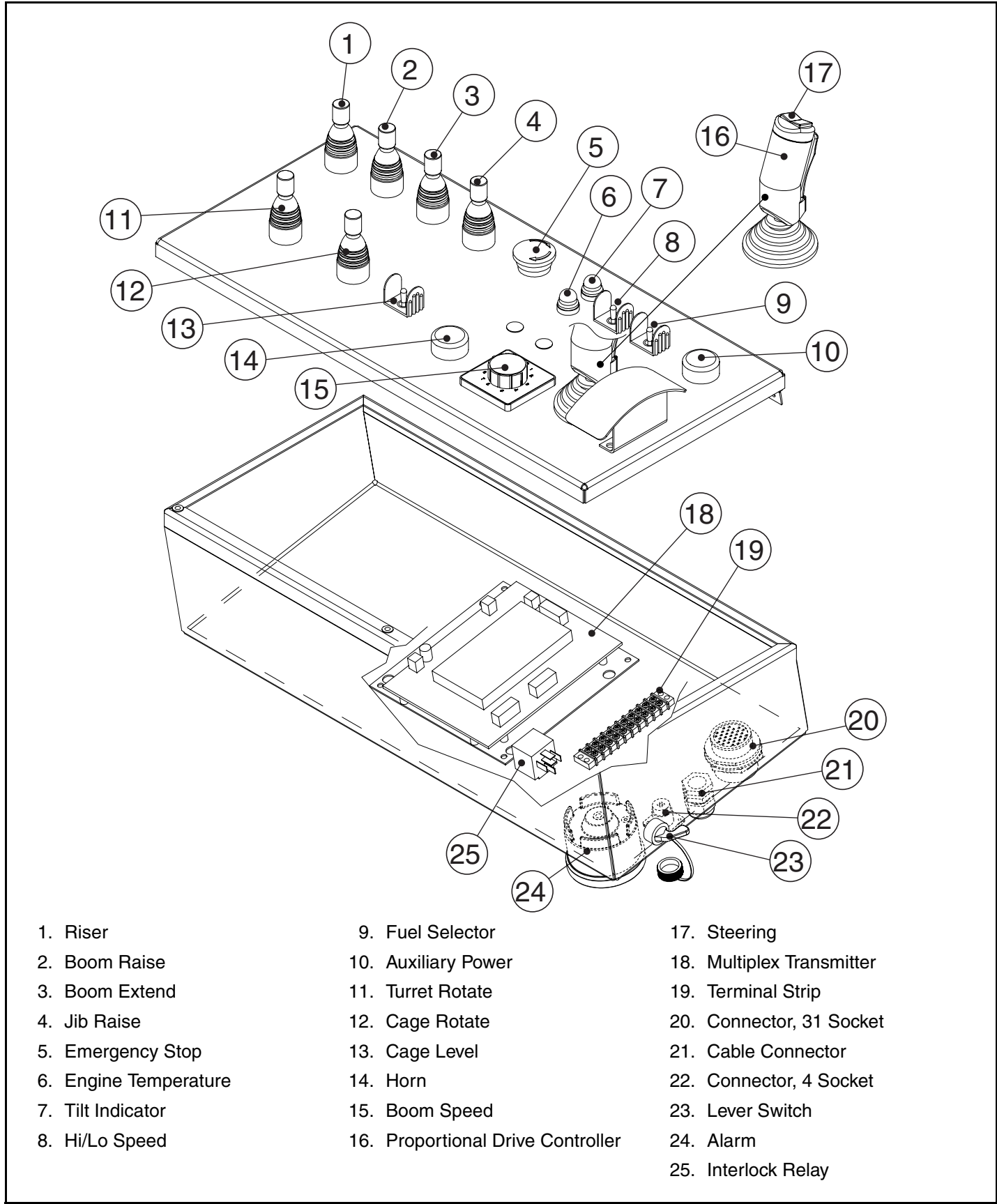


104048-011 Hydraulic Schematic

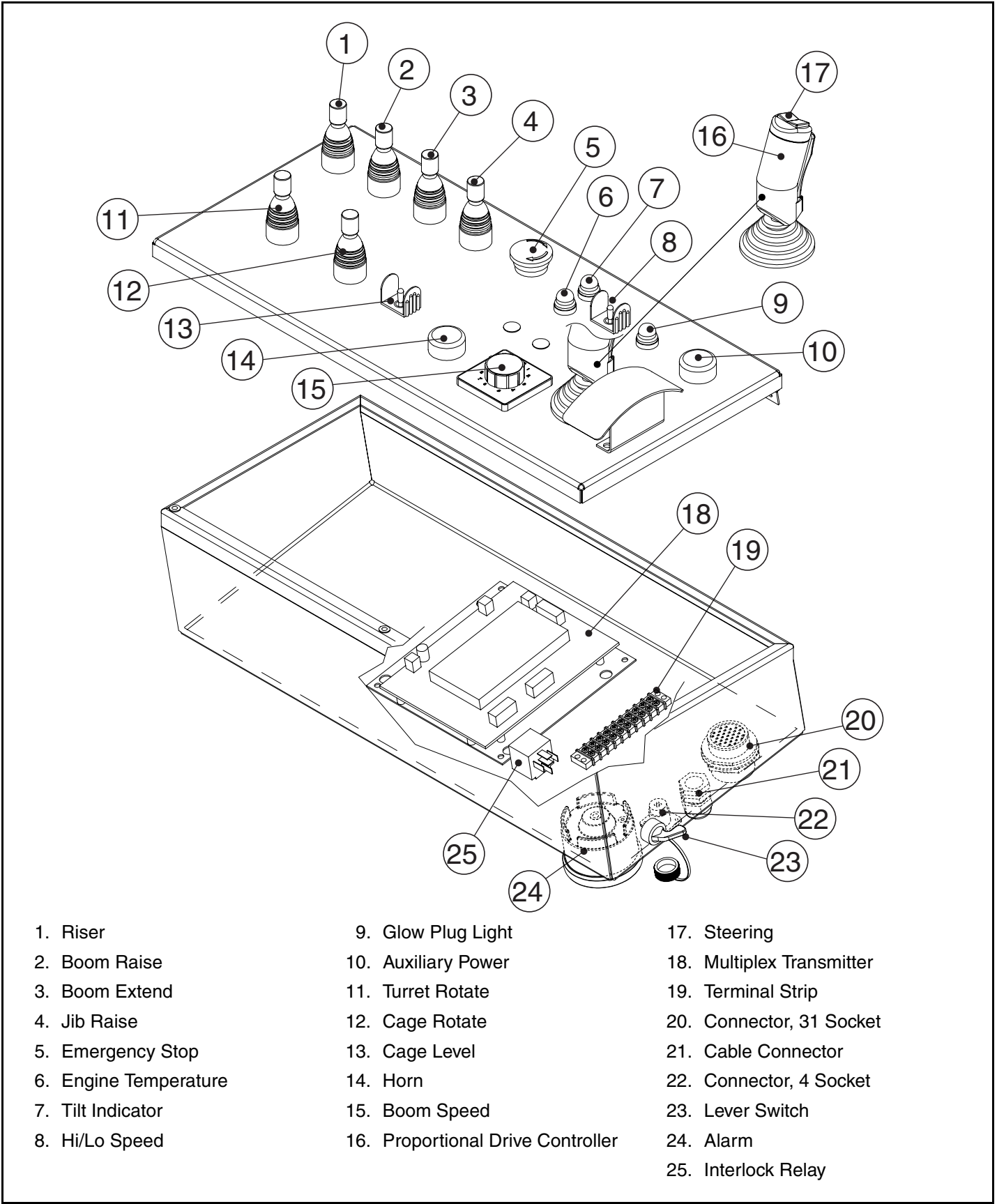


4-4 PLATFORM CONTROLS

104531-001 GASOLINE/LPG PLATFORM CONTROL BOX



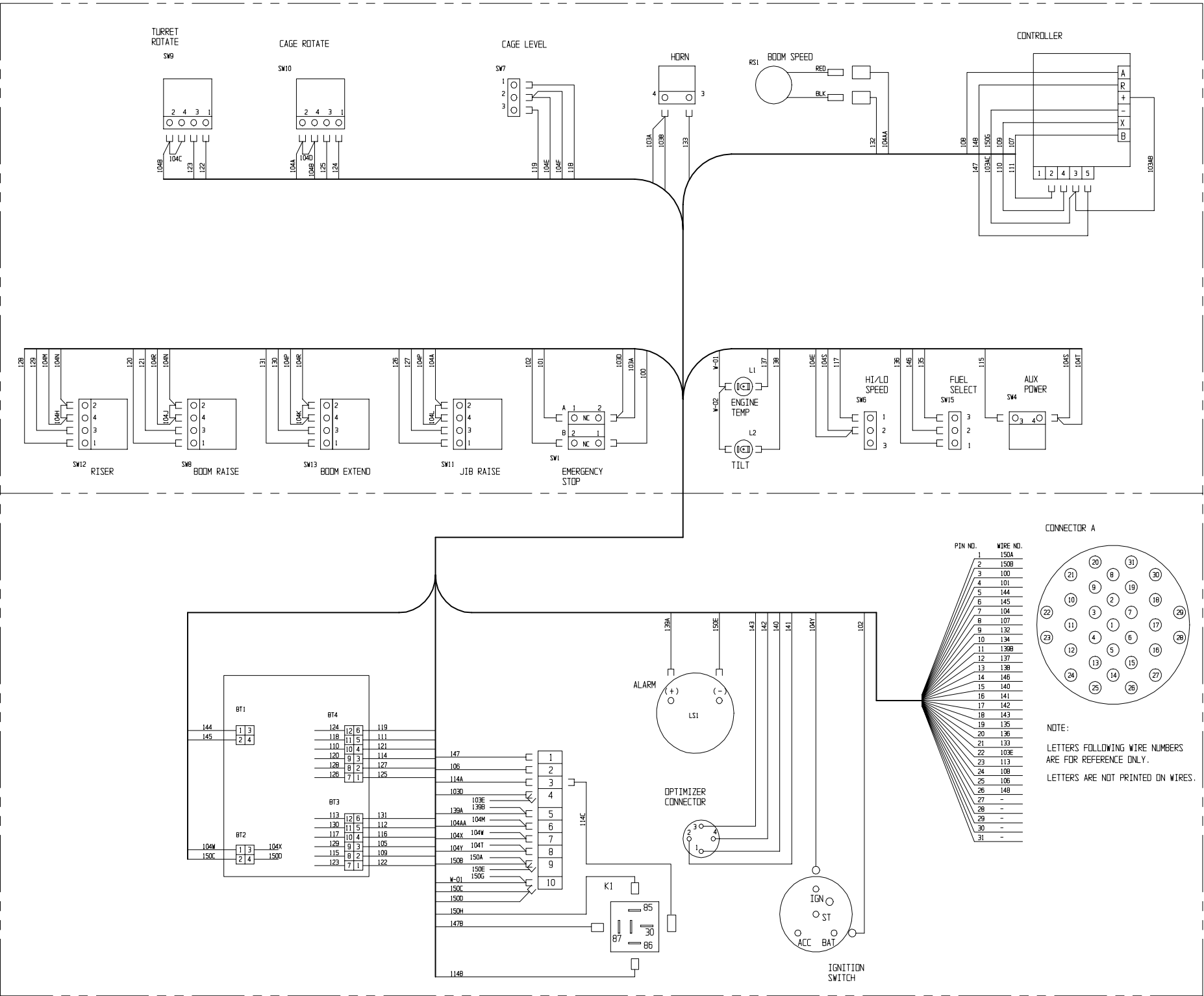
104531-000 DIESEL PLATFORM CONTROL BOX



104531-001 - PLATFORM CONTROLS WIRING DIAGRAM - GASOLINE/LPG

WIRE NO.	SIZE	FROM	TO
100	18 AWG	SW1B-1	A-3
101	18 AWG	SW1A-1	A-4
102	18 AWG	SW13-2	IGN (BAT)
103A	16 AWG	HORN 4	SW1A-2
103B	16 AWG	-	HORN 4
103D	18 AWG	TB3-4	SW1A-2
103E	16 AWG	A-22	TB3-4
103AB	18 AWG	CONTR TB-2	CONTR-(+)
103AC	18 AWG	CONTR TB-2	K1-B7
104	18 AWG	A-7	-
104A	18 AWG	SW10-2	SW11-2
104B	18 AWG	SW9-2	SW10-4
104C	18 AWG	SW9-4	SW9-2
104D	18 AWG	SW10-2	SW10-4
104E	18 AWG	SW6-2	SW7-2
104F	18 AWG	SW7-2	-
104H	18 AWG	SW12-2	SW12-4
104J	18 AWG	SW8-2	SW8-4
104K	18 AWG	SW13-2	SW13-4
104L	18 AWG	SW11-2	SW11-4
104M	18 AWG	SW12-4	TB3-6
104N	18 AWG	SW12-2	SW8-2
104P	18 AWG	SW13-4	SW11-2
104R	18 AWG	SW8-4	SW13-2
104S	18 AWG	SW4-4	SW6-2
104T	18 AWG	SW4-4	TB3-8
104W	18 AWG	TB3-7	BT2-01
104X	18 AWG	TB3-7	BT2-03
104Y	18 AWG	IGN (IGN)	TB3-8
104AA	18 AWG	RS1-RED	TB3-6
106	18 AWG	A-25	TB3-2
107	18 AWG	A-8	CONTR-B
108	18 AWG	BT3-2	CONTR-A
109	18 AWG	BT3-2	CONTR-(X)
110	18 AWG	BT4-10	CONTR TB-3
111	18 AWG	BT4-5	CONTR TB-4
113	18 AWG	A-23	BT3-12
114A	18 AWG	BT3-3	TB3-3
114B	18 AWG	TB3-3	K1-B6
114C	18 AWG	K1-30	TB3-3
115	18 AWG	SW4-3	BT3-08
117	18 AWG	SW6-3	BT3-10
118	18 AWG	SW7-1	BT4-11
119	18 AWG	SW7-3	BT4-6
120	18 AWG	SW8-1	BT4-9
121	18 AWG	SW8-3	BT4-4
122	18 AWG	SW9-1	BT3-1
123	18 AWG	SW9-3	BT3-7
124	18 AWG	SW10-1	BT4-12
125	18 AWG	SW10-3	BT4-1
126	18 AWG	SW11-1	BT4-2
127	18 AWG	SW11-3	BT4-2
128	18 AWG	SW11-3	BT4-2
129	18 AWG	SW12-3	BT3-9
130	18 AWG	SW13-3	BT3-11
131	18 AWG	SW13-1	BT3-6
132	18 AWG	RS1-BLK	A-9
133	18 AWG	HORN-3	A-21

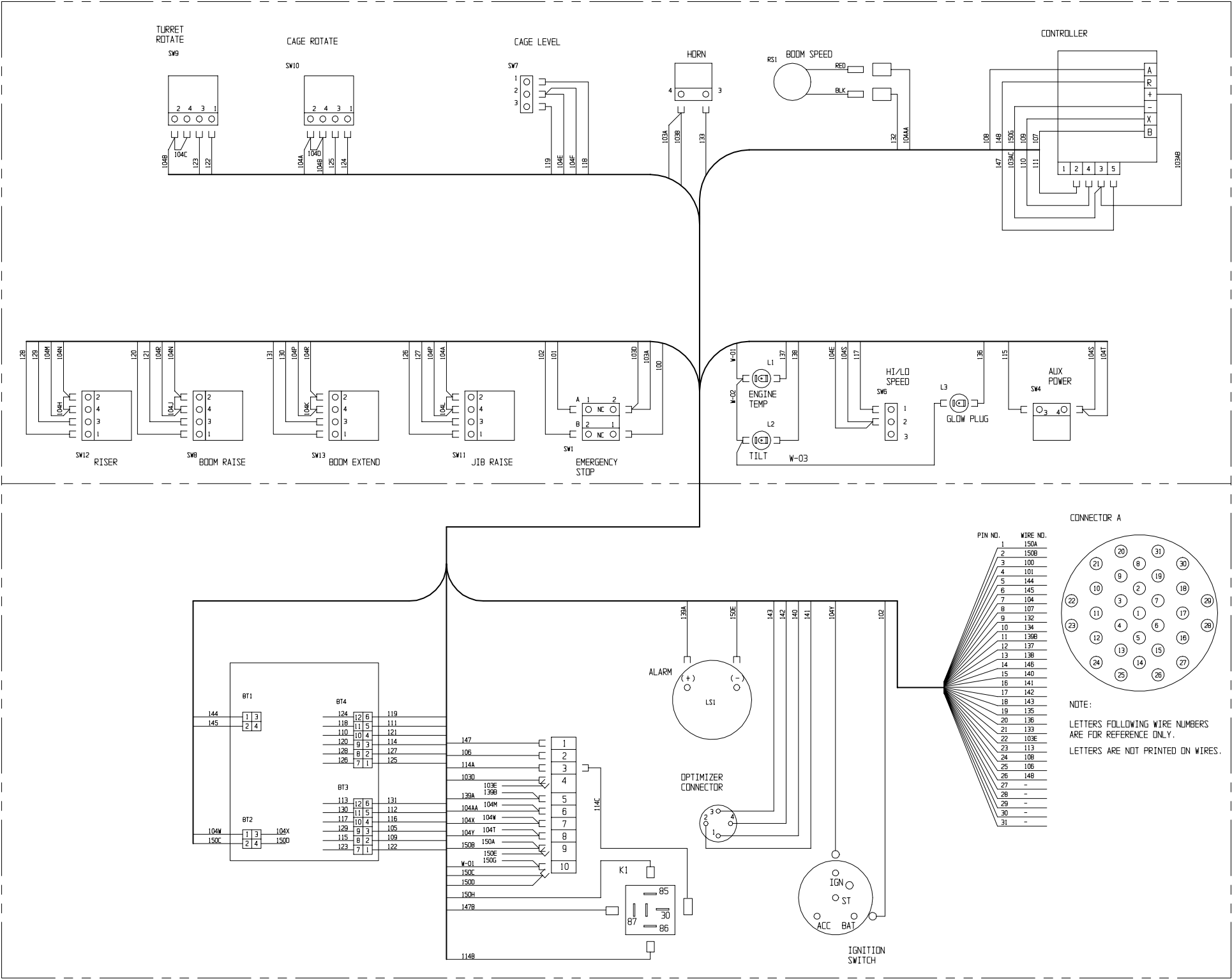
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136	18 AWG	SW15-1	A-20
137	18 AWG	L1	A-12
138	18 AWG	L2	A-13
139A	18 AWG	LS1(+)	TB3-5
139B	18 AWG	A-11	TB3-5
140	18 AWG	A-15	DPT-1
141	18 AWG	A-16	DPT-2
142	18 AWG	A-17	DPT-4
143	18 AWG	A-18	DPT-3
144	18 AWG	A-5	BT1-1
145	18 AWG	A-6	BT1-2
146	18 AWG	SW15-2	A-14
147A	18 AWG	TB3-1	CONTR TB-1
147B	18 AWG	TB3-1	K1-B7
148	18 AWG	A-26	CONTR-(R)
150A	18 AWG	A-1	TB3-9
150B	18 AWG	A-2	TB3-9
150C	18 AWG	TB3-9	BT2-02
150D	18 AWG	TB3-9	BT2-04
150E	18 AWG	TB3-10	LS1 (-)
150G	18 AWG	TB3-10	CONTR-(-)
150H	18 AWG	K1-B5	TB3-10
W-01	18 AWG	L1 GND	TB3-10
W-02	18 AWG	L1 GND	L2 GND
W-03	18 AWG	L2 GND	TB3-10



104531-000 - PLATFORM CONTROLS WIRING DIAGRAM - DIESEL

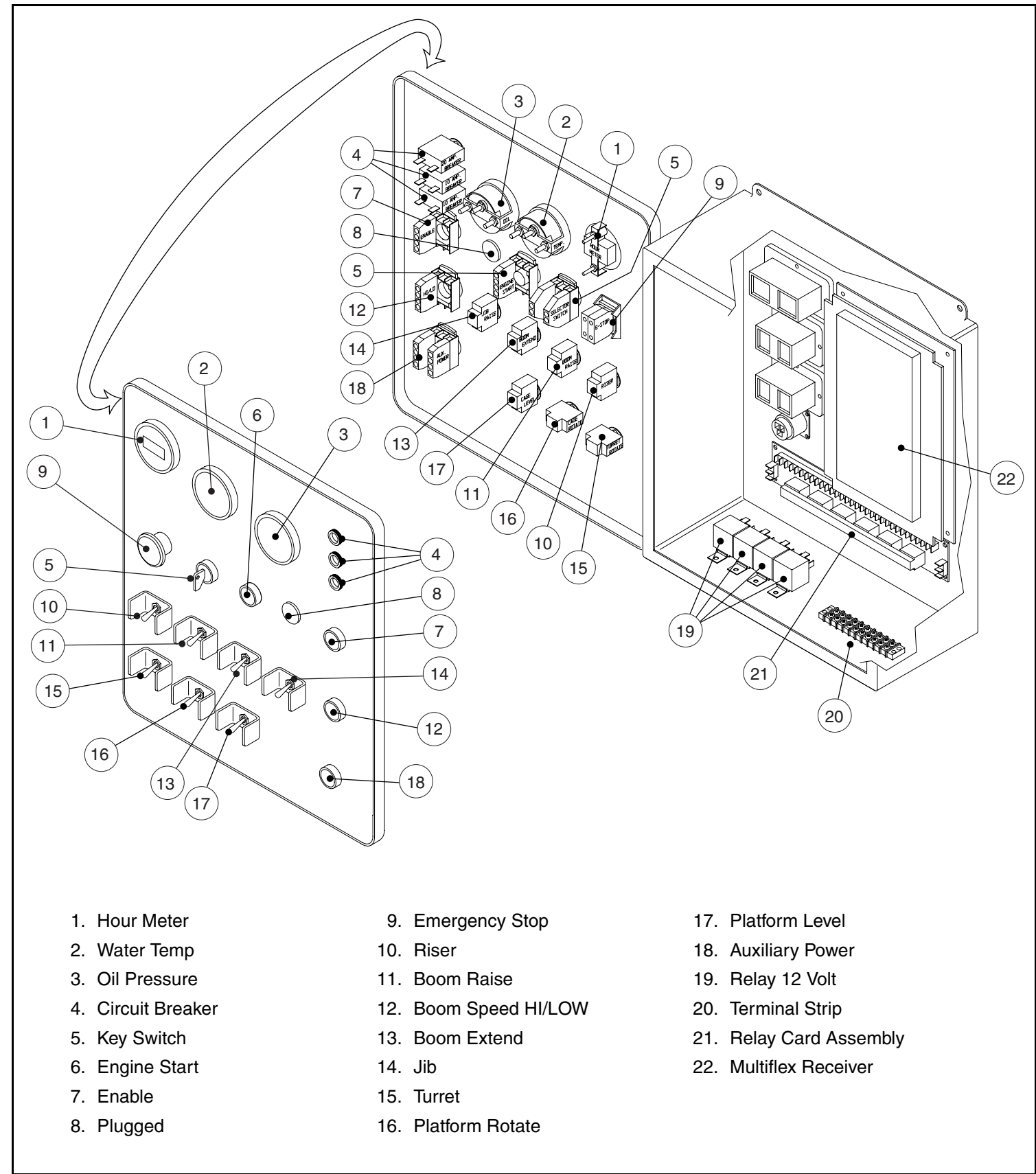
WIRE NO.	SIZE	FROM	TO
100	18 AWG	SW1B-1	A-3
101	18 AWG	SW1A-1	A-4
102	18 AWG	SW13-2	IGN (BAT)
103A	16 AWG	HORN 4	SW1A-2
103B	16 AWG	-	HORN 4
103D	18 AWG	TB3-4	SW1A-2
103E	16 AWG	A-22	TB3-4
103AB	18 AWG	CONTR TB-2	CONTR-(+)
103AC	18 AWG	CONTR TB-2	K1-87
104	18 AWG	A-7	-
104A	18 AWG	SW10-2	SW11-2
104B	18 AWG	SW9-2	SW10-4
104C	18 AWG	SW9-4	SW9-2
104D	18 AWG	SW10-2	SW10-4
104E	18 AWG	SW6-2	SW7-2
104F	18 AWG	SW7-2	-
104H	18 AWG	SW12-2	SW12-4
104J	18 AWG	SW8-2	SW8-4
104K	18 AWG	SW13-2	SW13-4
104L	18 AWG	SW11-2	SW11-4
104M	18 AWG	SW12-4	TB3-6
104N	18 AWG	SW12-2	SW8-2
104P	18 AWG	SW13-4	SW11-2
104R	18 AWG	SW8-4	SW13-2
104S	18 AWG	SW4-4	SW6-2
104T	18 AWG	SW4-4	TB3-8
104W	18 AWG	TB3-7	BT2-01
104X	18 AWG	TB3-7	BT2-03
104Y	18 AWG	IGN (IGN)	TB3-8
104AA	18 AWG	RS1-RED	TB3-6
106	18 AWG	A-25	TB3-2
107	18 AWG	A-8	CONTR-B
108	18 AWG	BT3-2	CONTR-A
109	18 AWG	BT3-2	CONTR-(X)
110	18 AWG	BT4-10	CONTR TB-3
111	18 AWG	BT4-5	CONTR TB-4
113	18 AWG	A-23	BT3-12
114A	18 AWG	BT3-3	TB3-3
114B	18 AWG	TB3-3	K1-86
114C	18 AWG	K1-30	TB3-3
115	18 AWG	SW4-3	BT3-08
117	18 AWG	SW6-3	BT3-10
118	18 AWG	SW7-1	BT4-11
119	18 AWG	SW7-3	BT4-6
120	18 AWG	SW8-1	BT4-9
121	18 AWG	SW8-3	BT4-4
122	18 AWG	SW9-1	BT3-1
123	18 AWG	SW9-3	BT3-7
124	18 AWG	SW10-1	BT4-12
125	18 AWG	SW10-3	BT4-1
126	18 AWG	SW11-1	BT4-2
127	18 AWG	SW11-3	BT4-2
128	18 AWG	SW11-3	BT4-2
129	18 AWG	SW12-3	BT3-9
130	18 AWG	SW13-3	BT3-11
131	18 AWG	SW13-1	BT3-6
132	18 AWG	RS1-BLK	A-9
133	18 AWG	HORN-3	A-21

WIRE NO.	SIZE	FROM	TO
136	18 AWG	L3	A-20
137	18 AWG	L1	A-12
138	18 AWG	L2	A-13
139A	18 AWG	LS1(+)	TB3-5
139B	18 AWG	A-11	TB3-5
140	18 AWG	A-15	DPT-1
141	18 AWG	A-16	DPT-2
142	18 AWG	A-17	DPT-4
143	18 AWG	A-18	DPT-3
144	18 AWG	A-5	BT1-1
145	18 AWG	A-6	BT1-2
147A	18 AWG	TB3-1	CONTR TB-1
147B	18 AWG	TB3-1	K1-87
148	18 AWG	A-26	CONTR-(R)
150A	18 AWG	A-1	TB3-9
150B	18 AWG	A-2	TB3-9
150C	18 AWG	TB3-9	BT2-02
150D	18 AWG	TB3-9	BT2-04
150E	18 AWG	TB3-10	LS1 (-)
150G	18 AWG	TB3-10	CONTR-(+)
150H	18 AWG	K1-85	TB3-10
W-01	18 AWG	L1 GND	TB3-10
W-02	18 AWG	L1 GND	L2 GND
W-03	18 AWG	L2 GND	TB3-10
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-	-	-	-
-	-	-	-

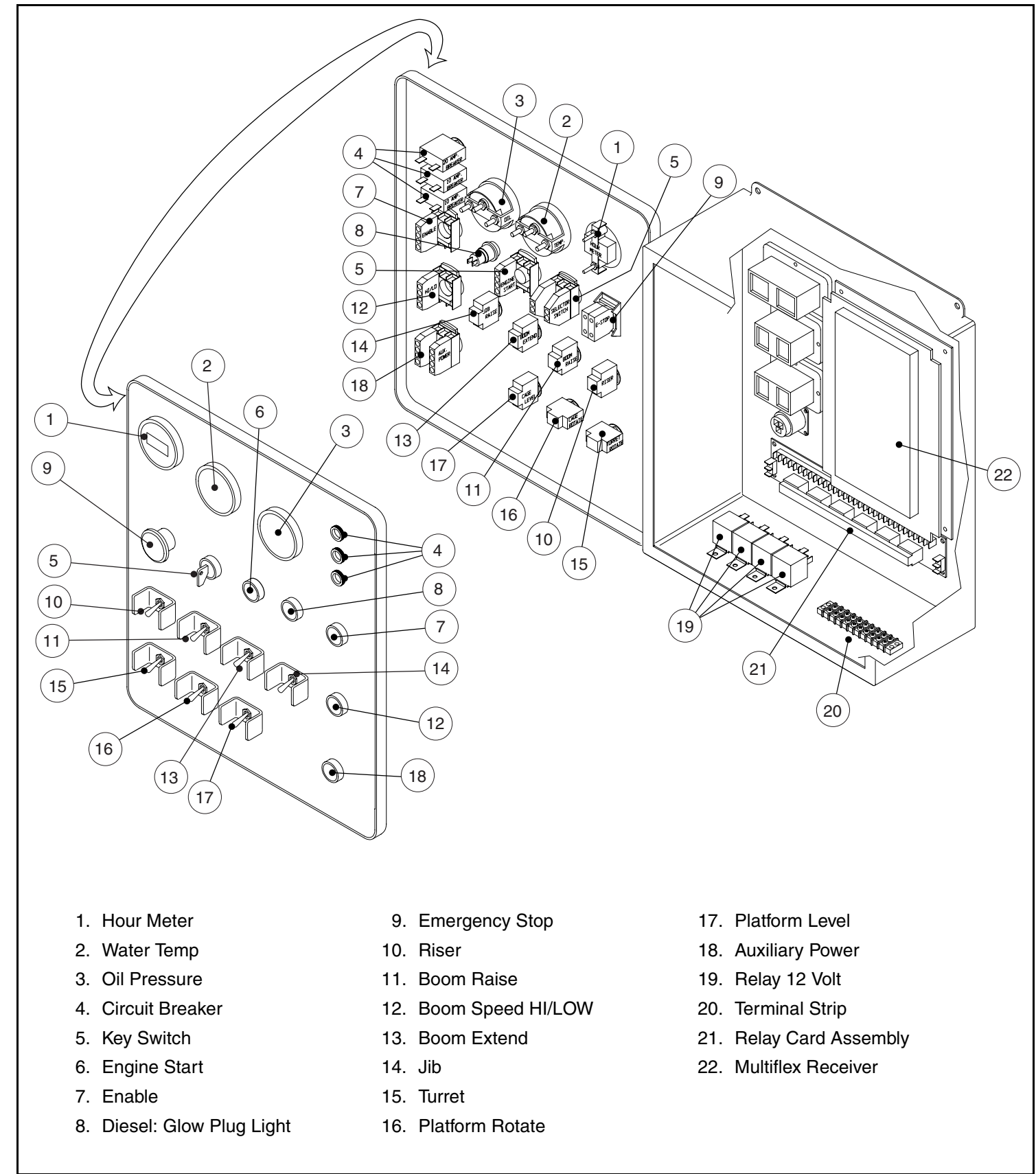


4-5 CHASSIS CONTROLS

104020-000 CHASSIS CONTROL BOX - GASOLINE/LPG

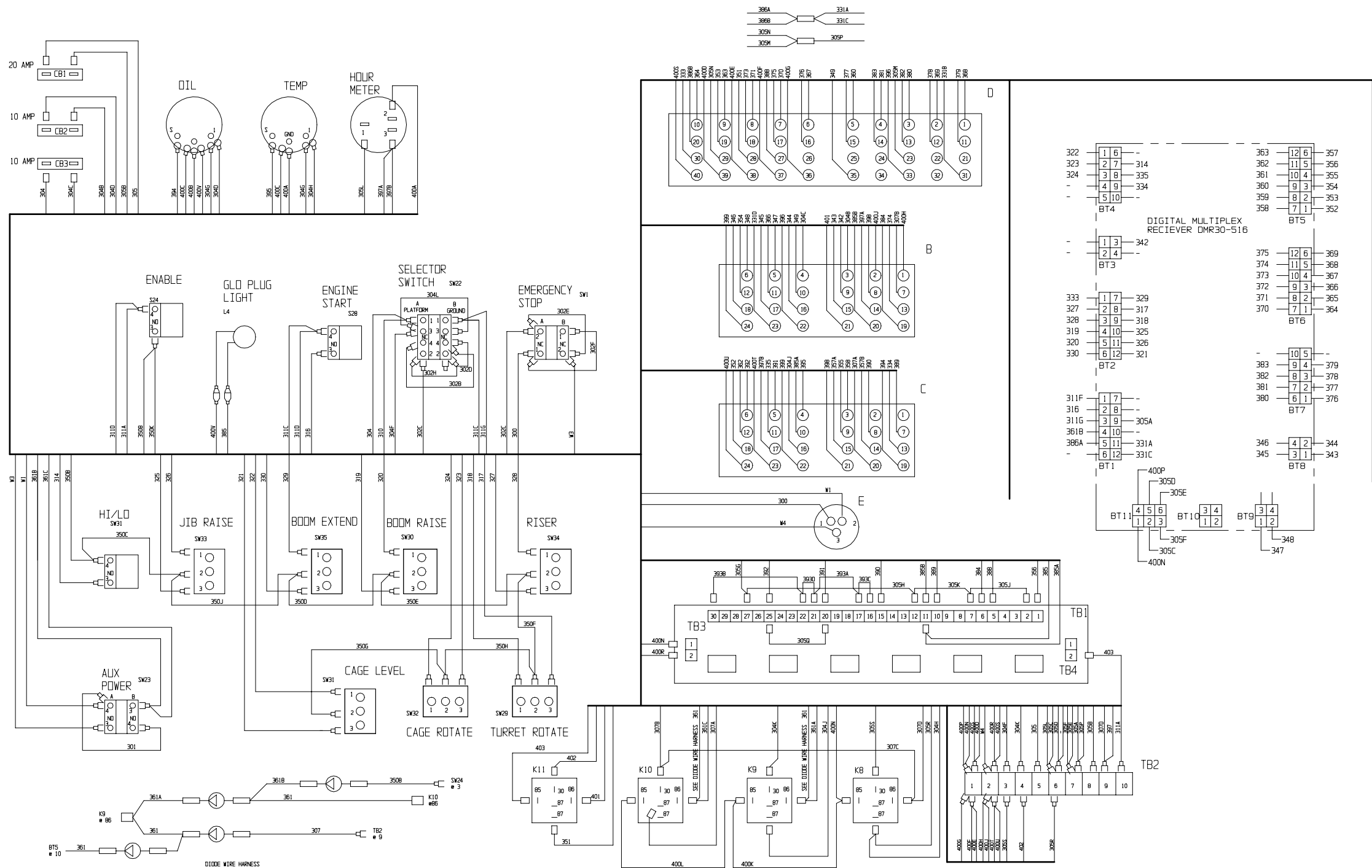


104019-000 CHASSIS CONTROL BOX - DIESEL

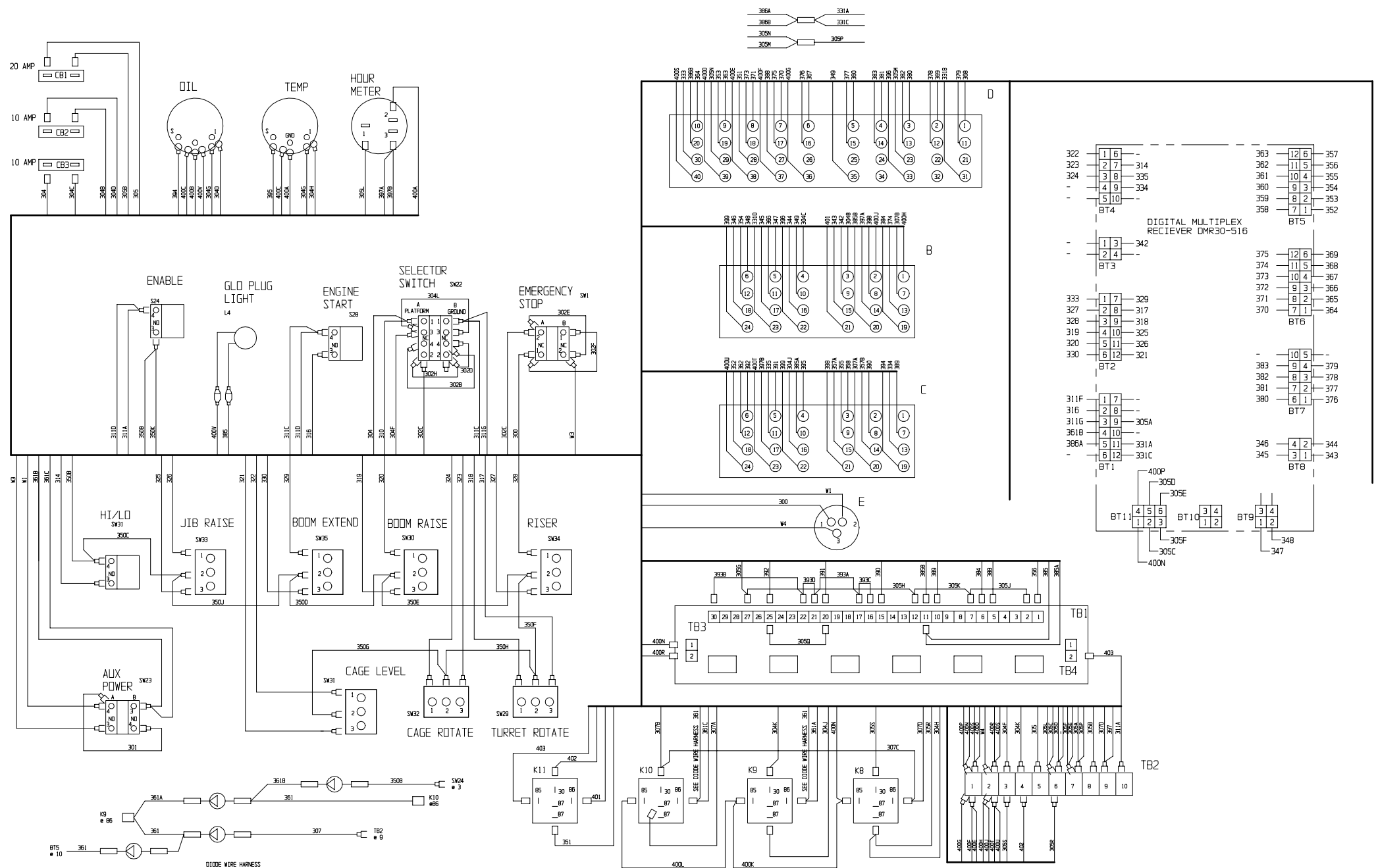


104020-000 - CHASSIS CONTROL BOX WIRING DIAGRAM - GASOLINE/LPG

WIRE NO.	SIZE	FROM	TO
300	12 AWG	SW1A-1	E1
301	18 AWG	SW23A-4	SW23B-4
302A	12 AWG	SW22A-3	SW22B-3
302B	18 AWG	SW22A-4	SW22B-4
302C	18 AWG	SW22A-2	SW1A-2
302D	12 AWG	SW22B-2	SW22B-4
302E	12 AWG	SW22B-2	SW1A-2
302F	12 AWG	SW1A-1	SW1B-1
304	18 AWG	CB-3	TB2-3
304A	18 AWG	CB-3	CB-2
304B	18 AWG	CB-2	B3
304C	18 AWG	CB-3	B4
304D	18 AWG	CB-2	DIODE1
304D	18 AWG	DIODE1	DTL-1
304E	12 AWG	SW22A-2	SW22B-2
304F	12 AWG	SW22B-3	TB2-3
304G	18 AWG	DTL-1	TEMP-1
304H	18 AWG	TEMP-1	K9-30
304J	18 AWG	K9-B7	C16
304K	18 AWG	TB2-4	K9-30
305A	18 AWG	BT1-3	TB2-7
305B	12 AWG	CB-1	TB2-7
305C	18 AWG	BT11-02	TB2-6
305D	18 AWG	BT11-05	TB2-6
305E	18 AWG	BT11-06	TB2-7
305F	18 AWG	BT11-03	TB2-7
305G	18 AWG	TB1-27	TB2-6
305H	18 AWG	TB1-12	TB1-27
305J	18 AWG	TB1-2	TB1-7
305K	18 AWG	TB1-7	TB1-12
305L	12 AWG	HOUR-1	TB2-6
305M	18 AWG	D23	BUTT CONN
305N	18 AWG	D29	BUTT CONN
305P	18 AWG	BUTT CONN	TB2-7
305Q	18 AWG	TB1-20	TB1-25
305R	12 AWG	K8-B7	TB2-6
305S	18 AWG	K8-30	TB2-3
307	18 AWG	DIODE 2	TB2-10
307A	18 AWG	K10-B7	C20
307B	18 AWG	K10-30	B7
307C	18 AWG	K8-B6	K10-30
307D	18 AWG	K8-B6	TB2-9
311A	18 AWG	SW24-3	SW24B-2
311A	18 AWG	DIODE 2	TB2-10
-	18 AWG	-	-
311C	18 AWG	SW2B-4	SW22A-1
311D	18 AWG	SW24-4	SW2B-4
-	18 AWG	-	-
311F	18 AWG	SW22B-1	BT1-01
314	18 AWG	SW31-3	BT4-07
315	18 AWG	SW27-3	BT1-08
316	18 AWG	SW2B-3	BT1-02
317	18 AWG	SW29-1	BT2-08
318	18 AWG	SW29-3	BT2-09
319	18 AWG	SW30-3	BT2-04
320	18 AWG	SW30-1	BT2-05
321	18 AWG	SW31-3	BT2-12
322	18 AWG	SW31-1	BT4-1
323	18 AWG	SW32-3	BT4-02
324	18 AWG	SW32-1	BT4-3
325	18 AWG	SW33-3	BT2-10
326	18 AWG	SW33-1	BT2-11
327	18 AWG	SW34-3	BT2-02
328	18 AWG	SW34-1	BT2-03
329	18 AWG	SW35-1	BT2-07
330	18 AWG	SW35-3	BT2-06
331A	18 AWG	BT1-11	BUTT CONN
331B	18 AWG	BUTT CONN	D31
331C	18 AWG	BT1-12	BUTT CONN
331D	18 AWG	BUTT CONN	B23
333	18 AWG	BT2-01	D30
334	18 AWG	BT4-09	C13
335	18 AWG	BT4-08	C11
342	18 AWG	BT3-03	B9
343	18 AWG	BT8-01	B15
344	18 AWG	BT8-02	B16
345	18 AWG	BT8-03	B17
346	18 AWG	BT8-04	B18
347	18 AWG	BT9-01	B5
348	18 AWG	BT9-02	B6
349	18 AWG	B10	D35
350A	18 AWG	SW24-4	SW33-2
350B	18 AWG	SW33-2	SW5-4
350C	18 AWG	SW35-2	SW6-4
350D	18 AWG	SW35-2	SW30-2
350E	18 AWG	SW30-2	SW31-2
350F	18 AWG	SW34-2	SW31-2
350G	18 AWG	SW34-2	SW32-2
350H	18 AWG	SW29-2	SW29-2
350I	18 AWG	SW29-2	SW29-2
350J	18 AWG	SW29-2	SW29-2
350K	18 AWG	SW29-2	SW29-2
350L	18 AWG	SW29-2	SW29-2
350M	18 AWG	SW29-2	SW29-2
350N	18 AWG	SW29-2	SW29-2
350O	18 AWG	SW29-2	SW29-2
350P	18 AWG	SW29-2	SW29-2
350Q	18 AWG	SW29-2	SW29-2
350R	18 AWG	SW29-2	SW29-2
350S	18 AWG	SW29-2	SW29-2
350T	18 AWG	SW29-2	SW29-2
350U	18 AWG	SW29-2	SW29-2
350V	18 AWG	SW29-2	SW29-2
350W	18 AWG	SW29-2	SW29-2
350X	18 AWG	SW29-2	SW29-2
350Y	18 AWG	SW29-2	SW29-2
350Z	18 AWG	SW29-2	SW29-2
351	18 AWG	SW29-2	SW29-2
352	18 AWG	SW29-2	SW29-2
353	18 AWG	SW29-2	SW29-2
354	18 AWG	SW29-2	SW29-2
355	18 AWG	SW29-2	SW29-2
356	18 AWG	SW29-2	SW29-2
357A	18 AWG	SW29-2	SW29-2
357B	18 AWG	SW29-2	SW29-2
358	18 AWG	SW29-2	SW29-2
359	18 AWG	SW29-2	SW29-2
360	18 AWG	SW29-2	SW29-2
361	18 AWG	SW29-2	SW29-2
361A	18 AWG	SW29-2	SW29-2
361B	18 AWG	SW29-2	SW29-2
361C	18 AWG	SW29-2	SW29-2
362	18 AWG	SW29-2	SW29-2
363	18 AWG	SW29-2	SW29-2
364	18 AWG	SW29-2	SW29-2
365	18 AWG	SW29-2	SW29-2
366	18 AWG	SW29-2	SW29-2
367	18 AWG	SW29-2	SW29-2
368	18 AWG	SW29-2	SW29-2
369	18 AWG	SW29-2	SW29-2
370	18 AWG	SW29-2	SW29-2
371	18 AWG	SW29-2	SW29-2
372	18 AWG	SW29-2	SW29-2
373	18 AWG	SW29-2	SW29-2
374	18 AWG	SW29-2	SW29-2
375	18 AWG	SW29-2	SW29-2
376	18 AWG	SW29-2	SW29-2
377	18 AWG	SW29-2	SW29-2
378	18 AWG	SW29-2	SW29-2
379	18 AWG	SW29-2	SW29-2
380	18 AWG	SW29-2	SW29-2
381	18 AWG	SW29-2	SW29-2
382	18 AWG	SW29-2	SW29-2
383	18 AWG	SW29-2	SW29-2
384	18 AWG	SW29-2	SW29-2
385A	18 AWG	SW29-2	SW29-2
385B	18 AWG	SW29-2	SW29-2
385A	18 AWG	SW29-2	SW29-2
385B	18 AWG	SW29-2	SW29-2
388	18 AWG	SW29-2	SW29-2
389	18 AWG	SW29-2	SW29-2
390	18 AWG	SW29-2	SW29-2
391	18 AWG	SW29-2	SW29-2
392	18 AWG	SW29-2	SW29-2
393A	18 AWG	SW29-2	SW29-2
393B	18 AWG	SW29-2	SW29-2
393C	18 AWG	SW29-2	SW29-2
393D	18 AWG	SW29-2	SW29-2
394	18 AWG	SW29-2	SW29-2
395	18 AWG	SW29-2	SW29-2
396	18 AWG	SW29-2	SW29-2
397A	18 AWG	SW29-2	SW29-2
397B	18 AWG	SW29-2	SW29-2
398	18 AWG	SW29-2	SW29-2
399	18 AWG	SW29-2	SW29-2
400A	18 AWG	SW29-2	SW29-2
400B	18 AWG	SW29-2	SW29-2
400C	18 AWG	SW29-2	SW29-2
400D	18 AWG	SW29-2	SW29-2
400E	18 AWG	SW29-2	SW29-2
400F	18 AWG	SW29-2	SW29-2
400G	18 AWG	SW29-2	SW29-2
400H	18 AWG	SW29-2	SW29-2
400J	18 AWG	SW29-2	SW29-2
400K	18 AWG	SW29-2	SW29-2
400L	18 AWG	SW29-2	SW29-2
400M	18 AWG	SW29-2	SW29-2
400N	18 AWG	SW29-2	SW29-2
400P	18 AWG	SW29-2	SW29-2
400R	18 AWG	SW29-2	SW29-2
400S	18 AWG	SW29-2	SW29-2
400T	18 AWG	SW29-2	SW29-2
400U	18 AWG	SW29-2	SW29-2
-	-	-	-
-	-	-	-
W1	12 AWG	E2	SW23A-4
-	-	-	-
W3	12 AWG	SW23A-3	SW1B-2
W4	12 AWG	E3	TB2-9
W5	12 AWG	K8-30	TB2-3



WIRE NO.	SIZE	FROM	TO
302C	18 AWG	SW22A-2	SW22B-4
302D	18 AWG	SW22A-2	SW22B-2
302E	12 AWG	SW22A-2	SW1A-2
302F	12 AWG	SW22B-2	SW1B-2
302G	18 AWG	SW22B-2	K9-30
302H	18 AWG	K9-B7	C16
304A	18 AWG	CB-3	CB-2
304B	18 AWG	CB-2	TB2-4
304C	18 AWG	CB-3	TEMP-1
304D	18 AWG	TEMP-1	D1L-1
304E	12 AWG	SW22A-3	SW22B-3
304F	12 AWG	SW22B-3	TB2-3
305A	12 AWG	CB-1	TB2-5
305B	12 AWG	CB-1	TB2-6
305C	18 AWG	BT11-02	TB2-7
305D	18 AWG	BT11-05	TB2-8
305E	18 AWG	BT11-06	TB2-8
305F	18 AWG	BT11-03	TB2-7
305G	18 AWG	TB1-27	TB2-8
305H	18 AWG	TB1-12	TB1-27
305J	18 AWG	TB1-2	TB1-7
305K	18 AWG	TB1-7	TB1-12
307A	18 AWG	K10-B7	C20
307B	18 AWG	K10-30	B27
307C	18 AWG	K8-B6	K10-30
307D	18 AWG	K8-B6	TB2-9
311A	18 AWG	SW24-3	SW22B-1
311B	18 AWG	SW24-3	D1ODE 2
311C	18 AWG	SW24-3	SW27-4
311D	18 AWG	SW24-3	SW2B-4
311E	18 AWG	SW27-4	SW2B-4
311F	18 AWG	SW22B-1	BT1-03
331A	18 AWG	BT1-11	BUTT CONN
331B	18 AWG	BUTT CONN	D31
331C	18 AWG	BT1-12	BUTT CONN
331D	18 AWG	BUTT CONN	B23
350A	18 AWG	SW24-4	SW33-2
350B	18 AWG	SW33-2	SW6-4
350C	18 AWG	SW35-2	SW6-4
350D	18 AWG	SW35-2	SW30-2
350E	18 AWG	SW30-2	SW31-2
350F	18 AWG	SW34-2	SW31-2
350G	18 AWG	SW34-2	SW32-2
350H	18 AWG	SW29-2	TB2-1
357A	18 AWG	BT5-06	C15
357B	18 AWG	-	C14
361A	18 AWG	SW23B-4	BT5-10
361B	18 AWG	D1ODE 1	K10-B6
361C	18 AWG	SW23B-4	BT4-07
361D	18 AWG	K9-B6	K10-B6
366A	18 AWG	BT1-05	TB1-16
366B	18 AWG	TB1-16	D20
393A	18 AWG	TB1-17	TB1-22
393B	18 AWG	TB1-22	TB1-30
397A	18 AWG	HOURMETER-1	B14
397B	18 AWG	HOURMETER-1	C17
400A	16 AWG	HOURMETER-2	TEMP-GRND
400B	16 AWG	TEMP-GRND	TB2-1
400C	16 AWG	TEMP-GRND	D1L GRND
400D	16 AWG	TB2-2	D39
400E	16 AWG	TB2-1	D38
400F	16 AWG	TB2-1	D37
400G	16 AWG	TB2-1	D36
400H	16 AWG	TB2-2	B1
400J	16 AWG	TB2-2	B2
400K	16 AWG	K9-B5	K8-B5
400L	16 AWG	K9-B5	K10-B5
400M	16 AWG	K8-B5	TB2-10
400N	16 AWG	BT11-01	TB3-1
400P	16 AWG	BT11-04	TB3-2
400R	16 AWG	TB3-2	K10-B5
400S	16 AWG	TB2-1	D40
W1	12 AWG	SW1B-1	SW23A-4
W2	18 AWG	SW23A-3	D1ODE1
W3	12 AWG	SW23A-3	E2
W4	12 AWG	E3	TB2-9
W5	12 AWG	K8-30	TB2-3



NOTES:

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