

Service & Parts Manual

AB46 RT

Serial Numbers 1900 - 2579

P/N 068344-001-R1

UpRight

SERVICE & PARTS

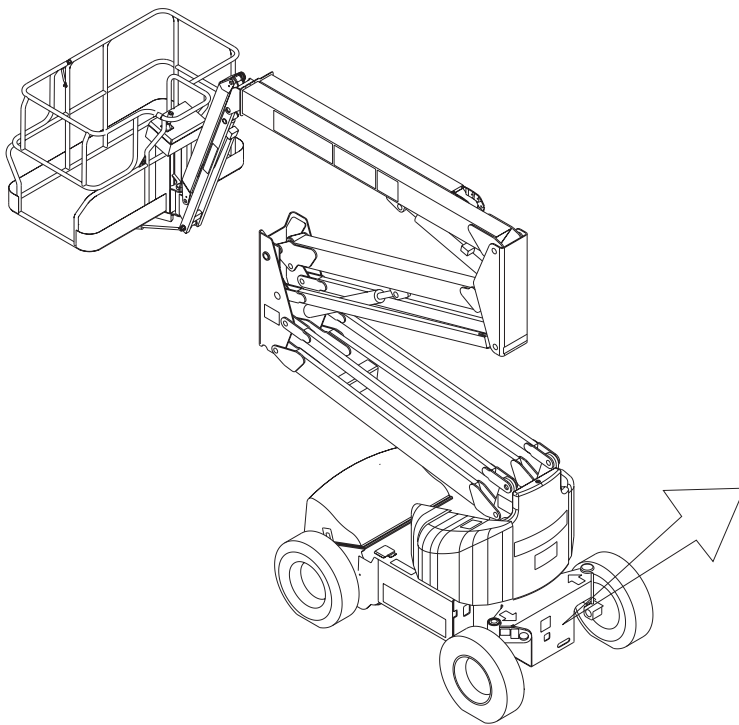
MANUAL

AB46 RT

Aerial Work Platform

Serial Numbers 1900 - 2579P

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

HOW TO USE THIS MANUAL

This manual is divided into 6 sections. The section number printed at the top corner of each page can be used as a quick reference guide.

Special information



Indicates the hazard or unsafe practice will result in severe injury or death.



Indicates the hazard or unsafe practice could result in severe injury or death.



Indicates the hazard or unsafe practice could result in minor injury or property damage

NOTES: Give helpful information.

WORKSHOP PROCEDURES

CAUTION: 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. 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 table.

Introduction & Specifications

General description and machine specifications.

1.0

Machine Preparation & Operation

Information on how to operate the work platform and how to prepare it for operation.

2.0

Maintenance

Preventative maintenance and service information.

3.0

Troubleshooting

Causes and solutions to typical problems.

4.0

Schematics

Schematics and valve block diagram with description and location of components.

5.0

Illustrated Parts Breakdown

Complete parts lists with illustrations.

6.0

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Section 1

INTRODUCTION & SPECIFICATIONS

1.1 INTRODUCTION

Purpose

The purpose of this service and parts manual is to provide instructions and illustrations for the operation and maintenance of the AB46 Work Platform manufactured by UpRight, Inc. of Madera, California.

Scope

The manual includes procedures for proper operation, maintenance, adjustment, and repair of this product as well as recommended maintenance schedules and troubleshooting.

1.2 GENERAL DESCRIPTION

The AB46 Work Platform consists of the platform, controller, elevating assembly, power module, control module, and chassis.

Platform

The platform has a reinforced steel floor, 1.11 m (43.5 inch) high guardrails with midrail, 152 mm (6 inch) toeboards, and an entrance gate at the side of the platform.

! WARNING !

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

Platform Controller

The platform controller contains the controls to operate the machine. It is located at the front of the platform cage. The foot switch must be depressed to operate any function from the platform. A complete explanation of control functions can be found in Section 2.

Elevating Assembly

The platform is raised and lowered by the elevating assembly: an articulated boom powered by two single stage lift cylinders. The hydraulic pump, driven by the engine, powers the cylinders. Solenoid operated valves control raising and lowering.

Chassis

The chassis is a structural frame that supports all the components of the AB46 Work Platform. It contains the engine, battery, hydraulic pump, and drive motor.

1.3 PURPOSE OF EQUIPMENT

The objective of the AB46 Work Platform is to provide a quickly deployable, self-propelled, variable height work platform to elevate personnel and materials to overhead work areas.

1.4 SPECIAL LIMITATIONS

Travel with the platform raised is limited to a creep speed range.

Elevating of the work platform is limited to firm, level surfaces only. Any degree of slope greater than 5° will sound a warning alarm when the machine is elevated. If the machine is lowered, a light will illuminate on the platform control box.

! DANGER !

The elevating function shall ONLY be used when the work platform is level and on a firm surface. The work platform is NOT intended to be driven over uneven, rough, or soft terrain when elevated.

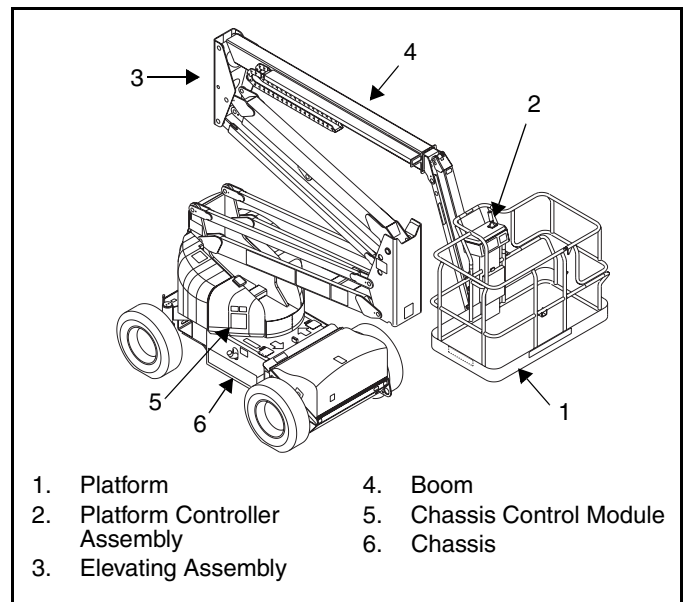


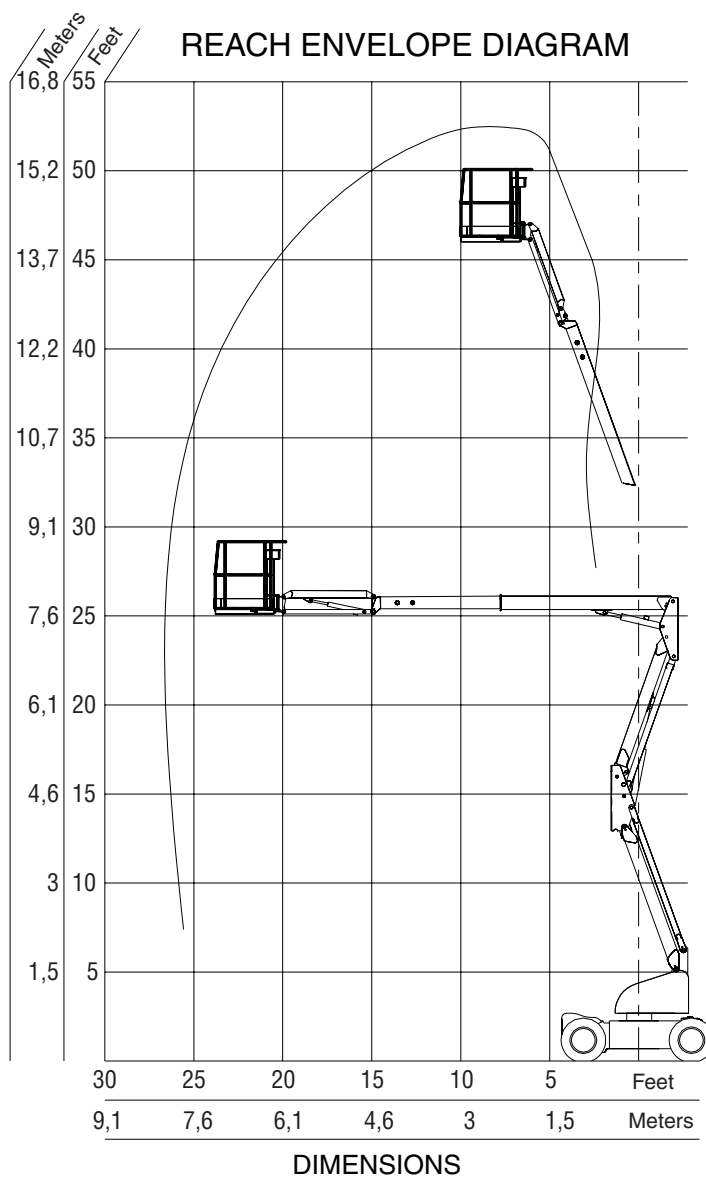
Figure 1-1: AB46 Work Platform

1.5 SPECIFICATIONS

Table 1-1: Work Platform Specifications

ITEM	Specification
Height	
Working height maximum	16,1 m (52 ft. 10 in.)
Platform height maximum	14,27 m (46 ft. 10 in.)
Platform step in height	48,25 cm (19 in.)
Up and over height	7,82 m (25 ft. 8 in.)
Drivable height	14,27 m (46 ft. 10 in.)
Horizontal outreach	7,47 m (24 ft. 6 in.)
Turret rotation	360 deg. noncontinuous
Platform rotation	160 deg.
Tail swing	None
Jib length	1,52 m (5 ft.)
Jib arc	140°
Inside turning radius	91,44 cm (3 ft.)
Outside turning radius	3,66 m (12 ft.)
Drive speed (lowered)	4.5 mph
Drive speed (elevated)	.6 mph
Gradeability	40%
Platform size	1,75 m x 1 m (69 in. x 39 in.)
Guardrail height	1,1 m (43 1/2 in.)
Toeboards	15,24 cm (6 in.)
Maximum platform capacity	226,8 kg (500 lbs.)
Maximum no. of occupants	2
Weight (Gas Model)	6559 kg (14,460 lbs.)
Weight (Diesel Model)	6649 kg (14,660 lbs.)
Overall height	2,23 m (7 ft. 4 in.)
Overall length	5,58 m (18 ft. 4 in.)
Overall width	2 m (6 ft. 7 in.)
Wheel base	2,18 m (7 ft. 2 in.)
Wheel track	1,65 m (5 ft. 5 in.)
Ground clearance	33 cm (13 in.)
Power source (Gas Model)	Ford VSG 413
Power source (Diesel Model)	Kubota V1505E-1
System voltage	12VDC
Maximum Hyd. Pressure	344,74 bar (5000 psi)
Controls	Electric Proportional
Tires	14 x 17.5 10 ply lug tread

* Specifications subject to change without notice.
Refer to Service Manual for complete parts and service information.
Meets or exceeds all applicable requirements of OSHA and ANSI A92.5-1992



Section 2

MACHINE PREPARATION & OPERATION

Safety Rules

Warning

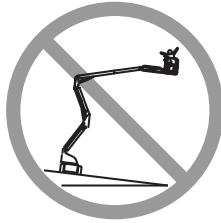
All personnel shall carefully read, understand and follow all safety rules, operating instructions, and the Scaffold Industry Association's **Manual of Responsibilities (ANSI A92.6)** before operating or performing maintenance on any UpRight aerial work platform.

Electrocution Hazard



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

Collision Hazard



NEVER position the platform without checking for overhead obstructions.

Tip Over Hazard



NEVER elevate or drive elevated on uneven slopes or soft ground or elevate the platform unless the platform is level.

Fall Hazard



NEVER sit, stand, or climb on guardrail or midrail.

ALL OCCUPANTS must wear an approved fall restraint properly attached to designated platform anchorage point. Attach only one fall restraint to each anchorage point.

NEVER exceed maximum platform load of 500 lbs. (225 kg) or two (2) occupants.

NEVER exceed 45 lbs. (200 N) of side force per occupant.

DISTRIBUTE all platform loads evenly on the platform.

NEVER operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps, curbs, or debris; and avoiding them.

OPERATE machine only on surfaces capable of supporting wheel loads.

NEVER elevate the machine when wind speeds exceed 28 mph (12,5 m/sec.).

IN CASE OF EMERGENCY push emergency stop button to cut power to all machine functions.

ALWAYS close and secure gate after entering platform.

NEVER exit or enter platform while elevated.

NEVER use ladders, scaffolding, or other items to gain height; work only from the platform floor.

NEVER climb down elevating assembly while platform is elevated.

INSPECT the machine thoroughly for cracked welds, loose or missing hardware, hydraulic leaks, loose wire connections, and damaged cables or hoses before using.

VERIFY that all labels are in place and legible before using.

NEVER use a machine that is damaged, not functioning properly, or has damaged or missing labels.

IF ALARM SOUNDS while boom is elevated, STOP, carefully retract boom and lower platform without rotating. Move machine to a firm, level surface.

NEVER attach overhanging loads or use boom as a crane.

NEVER alter operating or safety systems without manufacturers written consent.

NEVER charge battery near sparks or open flame. Charging batteries emit explosive hydrogen gas.

NEVER replace any component or part with anything other than original UpRight replacement parts without the manufacturer's written consent.

NEVER tow the machine. Transport by truck or trailer only.

AFTER USE, secure the work platform from unauthorized use by turning both keyswitches 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.

2.1 INTRODUCTION

This manual covers the operation of internal combustion powered models of the AB-46 RT Articulated Boom.

2.2 PRE-OPERATION AND SAFETY INSPECTION

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 panels and check hydraulic components / hoses for damage or leaks. Check electrical components / wiring for damage or loose connections.
2. Inspect chassis, axles, hubs, and steering linkage for damage, deformation, buckled paint, loose or missing hardware, and cracked welds.
3. Check tires for damage, punctures, and inflation; tire pressure must be 55 psi (3,8 bar).
4. Check all hoses / cables for wear.
5. Inspect elevating assembly for damage, deformation, buckled paint, loose or missing hardware, and cracked welds.
6. Inspect platform and guardrails for damage, deformation, buckled paint, loose or missing hardware, and cracked welds. Insure that gate operates freely and latches securely.
7. Check Hydraulic fluid level with platform fully lowered.
8. Check battery fluid level.
9. Check fuel level, add fuel if necessary.
10. Ensure that radiator is cold, check coolant level. Add if necessary.

W A R N I N G

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

2.3 SYSTEM FUNCTION INSPECTION

NOTE: Refer to Figure 2-1 and Figure 2-2 for chassis and platform control locations.

1. Before performing the following tests, check area around machine and overhead for obstructions, holes, drop-offs, and debris.
2. Turn chassis key switch to chassis, and turn on (rotate clockwise) emergency stop switches at the chassis control panel and at the platform control panel.
3. Press the engine start button to crank the engine; release when engine starts. If engine is cold: press the preheat button and hold for six seconds prior to starting diesel models.
4. Push in the chassis emergency stop button engine should stop. Repeat for platform emergency stop button. Return both emergency stop buttons to the on position, and start engine.
5. Operate each function switch 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.
6. Turn chassis key switch to platform.
7. Mount the platform, close and latch the gate, and attach approved fall restraint to designated platform anchorage point. Attach only one fall restraint to each point.
8. Start the engine.
9. Without depressing the foot switch, move the drive control handle, machine should not function.
10. Depress the foot switch and move the drive control handle forward and reverse. Observe that proportional functions operate smoothly, and that brakes apply quickly after control is released.
11. While depressing foot switch, operate steer switch to left and right. Observe that steering wheels turn properly.
12. While depressing foot switch, turn function speed control knob to desired setting, and operate boom controls. Observe that boom operates smoothly, and that upper boom, jib, turret rotation, platform level, and platform rotation controls operate proportionally in conjunction with function speed control knob. Observe that platform maintains level when boom is elevated.
13. With the upper boom elevated one foot, operate drive control handle. Observe that drive speed is limited to creep approximately 1 foot (0,3m) per second). Lower upper boom to stowed position.
14. Press the service horn button. Observe that horn is audible.

W A R N I N G

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

2.4 CONTROLS AND INDICATORS

NOTE: The following list corresponds to the numbered items in figures one and two.

1. Emergency stop.
2. Engine start.
3. Speed Selector.
4. Keyswitch.
5. Control fuses.
6. Riser control.
7. Upper boom control.
8. Boom extension control.
9. Jib control.
10. Turret rotation control.
11. Platform rotation control.
12. Platform level control.
13. Hourmeter.
14. Service horn button.
15. Drive control handle.
16. Function speed control.
17. Fuel selector (dual fuel).
18. Foot switch (located on platform floor).
19. Out of level indicator.
20. Preheat button (diesel).

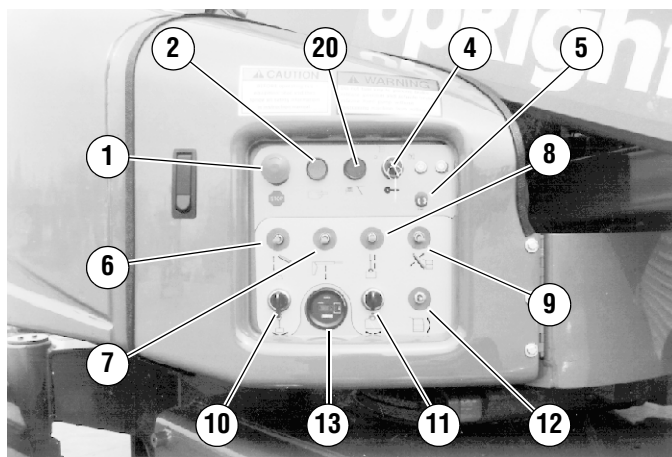


Figure 2-1: Chassis Controls

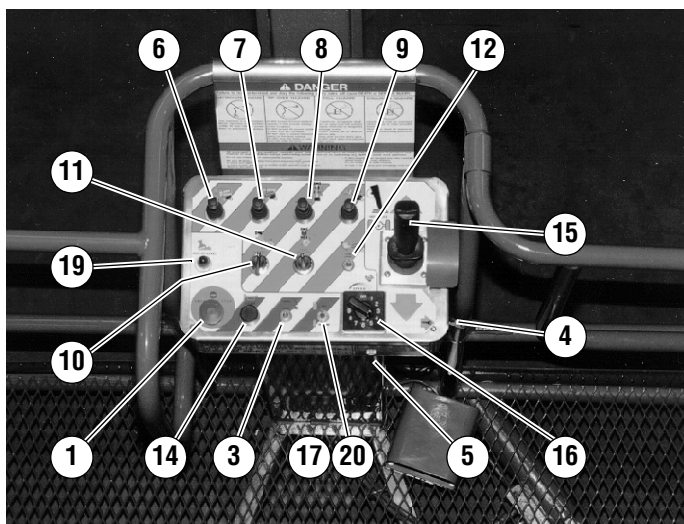


Figure 2-2: Platform Controls

2.5 OPERATION

Before operating work platform insure 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.

Refer to Figure 2-1 and Figure 2-2 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.

! WARNING !

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

Attach only one fall restraint to each anchorage point (see Figure 2-3).



Figure 2-3: Fall Restraint Anchorage Point



Starting the engine

From the lower controls

1. Turn the chassis key switch to chassis position.
2. Press the start button to crank the engine. Release when the engine starts.
3. When the engine is cold: press and hold the choke button while starting gasoline / propane engines; press and hold the glow plug button for six seconds prior to starting diesel engines.

From the platform controls

1. Turn the chassis key switch to platform controls.
2. Turn the platform keyswitch fully clockwise to crank the engine. Release when engine starts.
3. When the engine is cold: Press and hold the choke button while starting gasoline / propane engines. Press and hold the glow plug button for six seconds prior to starting the diesel engine.



Driving

With Boom Lowered

1. Turn 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 approved fall restraint to designated platform anchorage point. Attach only one fall restraint to each point (see Figure 2-3).
4. Start 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 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.
7. While driving, press the differential lock button, located on the front of the drive control handle, as necessary for improved traction.

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 boom elevated is restricted to firm level surfaces only.

When driving elevated, the machine will travel at creep speed 1/2 foot (0,15m) per second.

Steering

1. While depressing the foot switch, push the steering switch (located on top of the control handle) to the left to turn left, and right to turn right.

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

2.6 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 page five 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 firmly planted on the platform floor at all times.

Multifunction Controls

The UpRight AB-46 employs the use of multifunction controls. This means that riser or boom extension will function at full speed while simultaneously operating upper boom, jib, turret, or rotating the platform.

The turret may be rotated while driving if necessary to make turns in tight areas. All other boom functions will not operate while driving.

Lower Control Operation

All boom functions will operate at fixed speed.

1. Turn chassis keyswitch to chassis controls.
2. With engine running, operate boom control switches to position the platform.



Leveling the Platform

! WARNING !

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

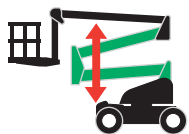
NOTE Platform leveling can be performed only with the boom stowed and should be done only to calibrate the automatic leveling system.

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.



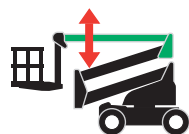
Rotating the Turret

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 foot switch, turn the turret rotation control switch counterclockwise to rotate left, clockwise to rotate right. Release the switch to stop rotation. Observe the area around the boom when rotating the turret to avoid any obstructions.



Elevating the Riser

1. 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. The riser will function at a constant speed, function speed control setting is not necessary.



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. While depressing the foot switch, push the boom extension control lever rearward to extend the boom, forward to retract the boom. Release the control lever to stop extending / retracting. The boom extension will function at a constant speed, function speed control setting is not necessary.



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. 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, turn the platform rotation control switch counterclockwise to rotate left, clockwise to rotate right. Release the switch to stop rotation.

2.7 EMERGENCY OPERATION

In the event of powered function failure, the elevating assembly may be lowered manually by the following procedure.

! WARNING !

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

Lowering Elevating Assembly

1. Open the cover on the hydraulic module (opposite side of the turret from the chassis control panel).
2. Remove the wire loop retainer from the hand pump lever, and extend the handle upward to gain leverage.
3. Operate the manual override (knurled knob) on the appropriate valve (see Figure 2-4). Push in to lower / extend, pull out to raise / retract as required.
4. While holding the appropriate valve in position, pump the handle in and out until that section of the elevating assembly is lowered / retracted.
5. Repeat as necessary operating each valve until the elevating assembly is fully lowered.
6. Restore valves to original position after emergency operation.

Rotating Turret

1. To manually rotate the turret, remove the manual turret crank from inside of the control side turret cover.
2. Set ratchet direction on turret crank.
3. Place the socket of the crank onto the hex shaft stub of the turret rotation gearbox.
4. Turn the crank clockwise to rotate the turret counterclockwise, turn counterclockwise to rotate the turret clockwise (see Figure 2-5).

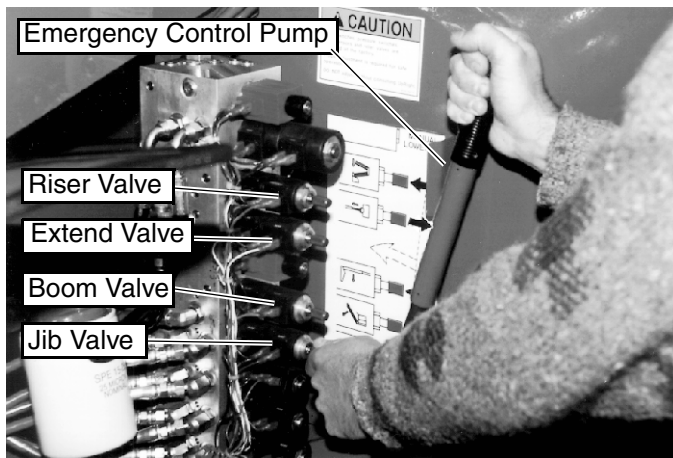


Figure 2-4: Emergency Control Operation



Figure 2-5: Manual Turret Rotation

2.8 EMERGENCY 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.

The batteries must be connected in order to release the brakes.

1. Insure that the platform is fully lowered, and that the turret is rotated so that the platform is to the rear of the machine.
2. Attach chain / cable of sufficient strength for towing the machine to front or rear tie down lugs.
3. Turn the keyswitch to the parking brake release position. Alarm will sound.
4. Operate the brake release hand pump located on the back of the right rear bulkhead.
5. After moving the machine, return the keyswitch to the off position and remove the key to prevent unauthorized operation.

CAUTION

DO NOT move the machine faster than 3 mph(4,83 km/h). Faster speeds will damage drive components and void warranty.

2.9 AFTER USE EACH DAY

1. Ensure that the platform is fully lowered.
2. Park the machine on level ground, preferably under cover, secure against vandals, children or unauthorized operation.
3. Turn the key switch to **OFF** and remove all keys to prevent unauthorized operation.

2.10 TRANSPORTATION

By Crane

! WARNING !

Stand clear of machine when lifting.

Check specifications on back page, insure that crane and slings are of correct capacity to lift weight of unit.

1. Insure that boom is fully lowered and retracted.
2. Attach straps to chassis lifting lugs only. Insure that straps are adjusted properly to keep unit level when lifting.

By Truck or Trailer

1. Insure that boom is fully lowered and retracted.
2. Maneuver the machine onto bed of truck / trailer.
3. When winching, follow instructions for emergency towing. Attach winch cable to front tie down lugs.

! CAUTION !

Do not winch machine faster than 3 mph (4,83 km/h).

4. After winching, insure that brakes are set.
5. Secure the machine to the transport vehicle using chains / straps of adequate load capacity (refer to specifications, back page) attached to chassis tie down.
6. Place a 7.5" x 4" x 28" (19cm x 10cm x 71cm) wooden block under platform support braces as shown.
7. Attach ratchet strap; under platform floor grating, over support braces. Tighten securely, do not overtighten.

! WARNING !

NEVER elevate the machine while on a truck or trailer.

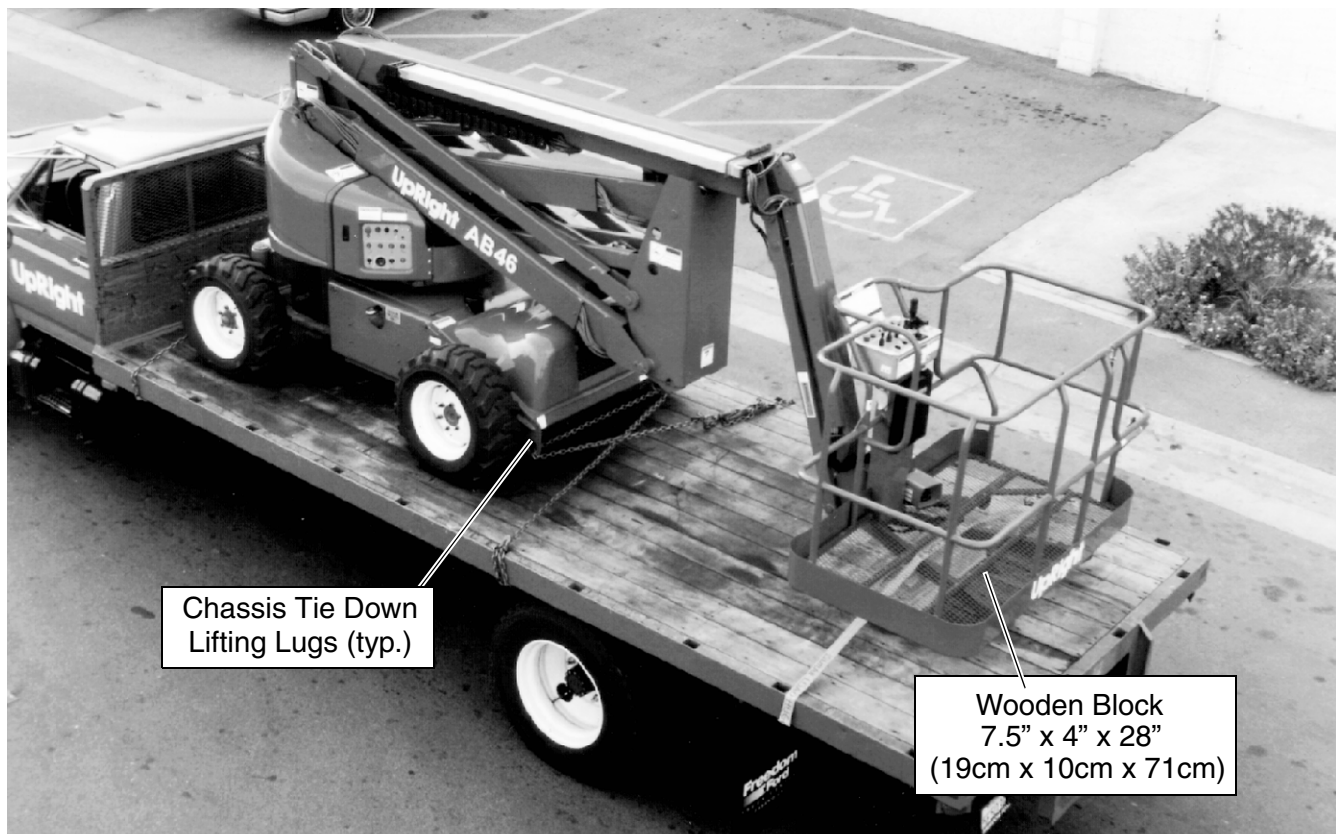


Figure 2-6: Securing the machine for transportation

2.11 MAINTENANCE

Fueling

Gasoline

1. Open fill pipe cap located on chassis left side (see Figure 2-7).
2. Fill to capacity with unleaded motor fuel only.
3. Check fuel level by lifting flap located on top of chassis left side. Fuel tank full capacity is 25 US gallons(94,6 l).

Diesel

1. Open fill pipe cap located on chassis left side (see Figure 2-7).
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.
3. Check fuel level by lifting flap located on top of chassis left side. Fuel tank full capacity is 25 US gallons(94,6 l).

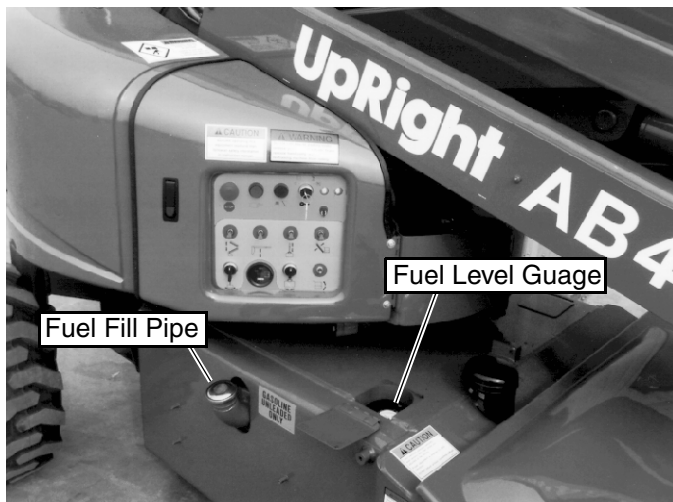


Figure 2-7: Fuel Pipe and Level Gauge

Hydraulic Oil

1. Check oil level at sight gauge inside engine compartment right hand side with the platform fully lowered.
2. If necessary, fill to capacity with clean ISO 46 compatible hydraulic oil.
3. Lift flap located on top of chassis right side.
4. Open filler / breather cap to add hydraulic oil (see Figure 2-8).
5. Replace cap.

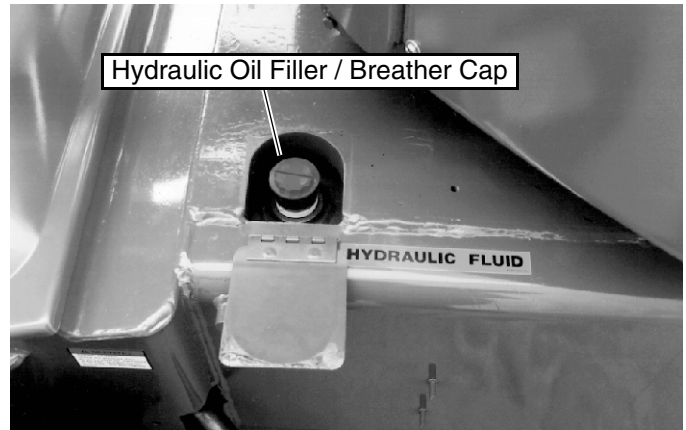


Figure 2-8: Hydraulic Oil Filler / Breather Cap

Lubrication

Refer to lubrication chart and guidelines.

Battery Maintenance

! WARNING !

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

Always wear safety glasses when working with battery.

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

Battery fluid is highly corrosive. Rinse away any spilled fluid thoroughly with clean water.

Always replace battery with UpRight battery or manufacturer approved replacement.

Check battery fluid level daily, especially if work platform is being used in a warm, dry climate.

If electrolyte level is lower than 3/8 in. (10 mm) above plates add distilled water only. DO NOT use tap water it will shorten battery life.

Keep terminals and top of battery clean.

Tires

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

Section 3

MAINTENANCE

3.1 INTRODUCTION

WARNING

Be sure to read, understand, and follow all information in the Operation Section of this manual before attempting to operate or perform service on any work platform.

NOTE: For information on the engine, refer to your local engine dealer.

This section contains instructions for the maintenance of the work platform. Procedures for the operation, inspection, adjustment, scheduled maintenance, and repair/removal are included.

Referring to Section 2 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.

Refer to “Table 3-1” on page 3-5 for recommended maintenance intervals.

NOTE: Unless otherwise specified, torque all fittings according to “Table 3-2 on page 3-26, and “Table 3-3” on page 3-26.

Terminology

TERMINAL BLOCKS: Located in upper and lower control boxes. Designated by TB##. (##) designates the number of the block which is written on the terminal block. “R” (right) or “L” (left) may follow the number.

WIRE COLOR: Indicated by color/color. First color refers to insulation color and second color indicates stripe. If second color is not given, there is no stripe.

FORWARD: Front of machine indicated by yellow arrows on chassis.

AFT: Rear of machine indicated by orange arrows on machine.

General Procedures

CONTACT BLOCKS: Removed by inserting a flat screwdriver into the slot at either end of block and prying outward. Installed by pressing into an empty slot.

SWITCH MOUNT BASE: Assembled to back of switch actuator. Removed by rotating the small black lever counterclockwise and lifting off base.

TERMINAL BLOCKS: Remove wires by inserting a small flat-bladed screwdriver into square beside wire. Install wires by stripping 1/2” of insulation, inserting screwdriver in square and inserting wire. Be sure no strands are bent backwards. Replace wires with same rating and type.

3.2 DATE CODE IDENTIFICATION ON HOSES

GATES uses a five digit code: Year, Month, Day.

i.e.: 6 11 29 - means 1996, month 11 (November), day 29.

PARKER uses a ten digit code: Plant, Year, Month, Day.

i.e.: XXXX 6 11 29 - means Plant XXXX, 1996, month 11 (November), day 29.

DAYCO stamps month, day and year on each hose.

3.3 SPECIAL TOOLS

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

- 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

3.4 UPRIGHT CONNECTORS

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



Figure 3-1: UpRight Connector Kit, Small



Figure 3-2: UpRight Connector Kit, Large

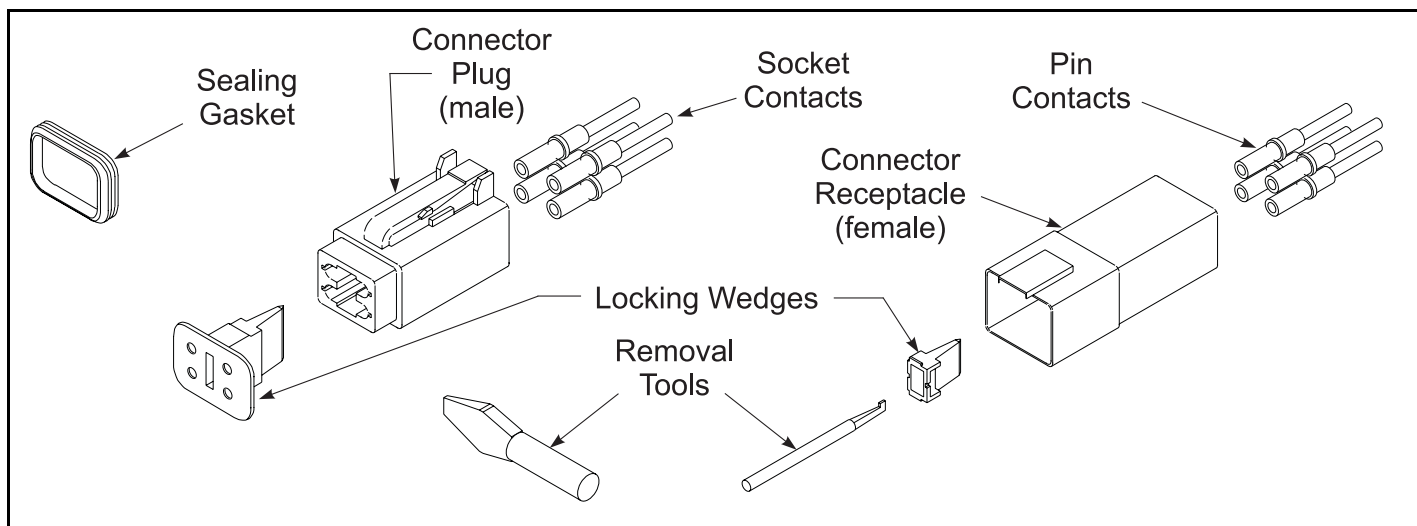


Figure 3-3: Plugs and Receptacles, UpRight Connectors

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 Silicon Gasket is not damaged during this procedure.
3. Check all parts for damage. Replace all parts which are damaged or worn.
4. Replace or recrimp the wires and contacts. Refer to "Crimping" procedure.

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 recrimp the wires and contacts. Refer to "Crimping" procedure.

Releasing Locking Fingers

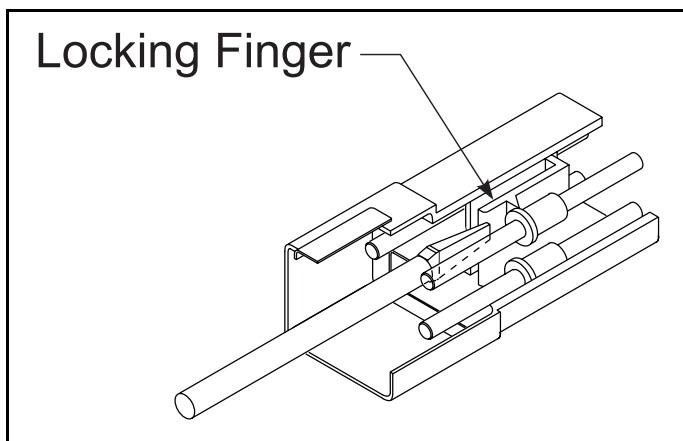


Figure 3-4: Locking Finger, UpRight Connector

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.

Crimping

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

1. Strip 1/4" (6 mm) from the wire.
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

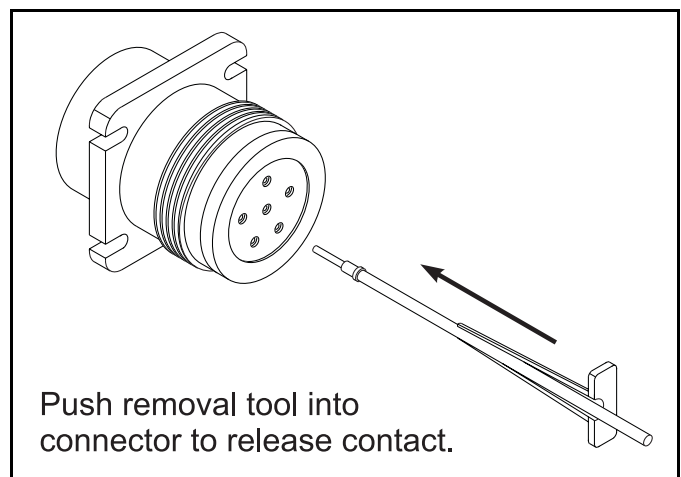


Figure 3-5: Heavy Duty UpRight Connector

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.

3.5 PREVENTATIVE MAINTENANCE

The complete inspection consists of periodic visual and operational checks, together with all necessary minor adjustments to ensure 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.

! WARNING !

Before performing preventative maintenance, familiarize yourself with the operation of the machine.

Always block the elevating assembly whenever it is necessary to perform maintenance while the platform is elevated.

The preventative maintenance table has been designed to be used primarily for machine service and maintenance repair. Please photocopy the following page and use the table as a checklist when inspecting the machine for service.

Preventative 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: _____

Table 3-1: Preventative Maintenance Checklist

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Engine Oil	Check level and condition	Daily			
	Check for leaks	Daily			
	*Change oil & filter (Dual Fuel)	100hours			
	*Change oil & filter (Diesel)	200hours			
Engine Fuel System	Check fuel level	Daily			
	Check for leaks	Daily			
	Replace fuel filter	6m			
Engine Air Cleaner	Replace air cleaner	6m			
	Check air cleaner	Daily			
Battery	Check electrolyte level	Daily			
	Clean exterior	3m			
	Clean terminals	3m			
Engine Coolant	Check coolant level (with engine cold)	Daily			
	Replace coolant	3m			
Hydraulic Oil	Check oil level	Daily			
	Change filter	6m			
	Drain and replace with ISO 46 compatible oil	2y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	30d			
	Check hoses for exterior wear	30d			
Emergency Hydraulic System	Check operation of emergency override valves and hand pump	Daily			
Controller	Check operation of all controls	Daily			
Platform	Check fasteners for proper torque	Daily			
Floor and Rails	Check welds for cracks	Daily			
	Check condition of platform	Daily			
	Check condition of anchorage points	Daily			
	Check condition of operators manual	Daily			
Tires	Check for damage	Daily			
	Check air pressure (55 psi)	Daily			
	Check lug nuts (torque to 90 ft. lbs. [123 Nm])	30d			
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			
Hydraulic Drive System	Check hydraulic drive motor operation	Daily			
	Check hoses, fittings, and valve block for leaks	Daily			

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Steering System	Check fittings for proper torque	6m			
	Oil all pivot points	30d			
	Check steering cylinder for leaks	30d			
	Check linkage for wear areas	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			
Turret	Check ring gear for proper lubrication and wear	Daily			
	Lubricate worm gear bearings	150h/3m			
	Lubricate ring gear (MoS2 grease)	150h/3m			
Drive 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			
Lift Cylinders	Check the cylinder rods for wear	30d			
	Check pivot pin retaining bolts for proper torque	30d			
	Check seals for leaks	30d			
	Inspect pivot points for wear	30d			
Entire Unit	Check fittings for proper torque	30d			
	Check for and repair collision damage	Daily			
	Check fasteners for proper torque	3m			
	Check for corrosion, remove and repaint	3m			
Labels	Lubricate	30d			
Labels	Check for peeling, missing, or unreadable labels & replace	Daily			
Slew Ring	Check fasteners for proper torque	30d			

* First oil change after 50 hours.

3.6 BLOCKING 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.

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

Installing Brace

1. Park the work platform on firm, level ground.
2. Fully retract upper boom.
3. Verify platform emergency stop switch is ON.
4. Turn platform/chassis switch to CHASSIS.

5. Using the raise button, elevate the platform 20 - 30 cm (8-12 inches).
6. Connect a crane or overhead hoist capable of supporting elevating assembly to front of elevating assembly.
7. Install brace capable of supporting elevating assembly under upper boom as shown.
8. Push lower button and gradually lower the platform until brace is supporting the platform.

Removing Brace

1. Using chassis controls, gradually raise the platform until upper boom is off brace.
2. Remove brace and unhook chain from front of upper boom.
3. Push lower button to completely lower the platform.

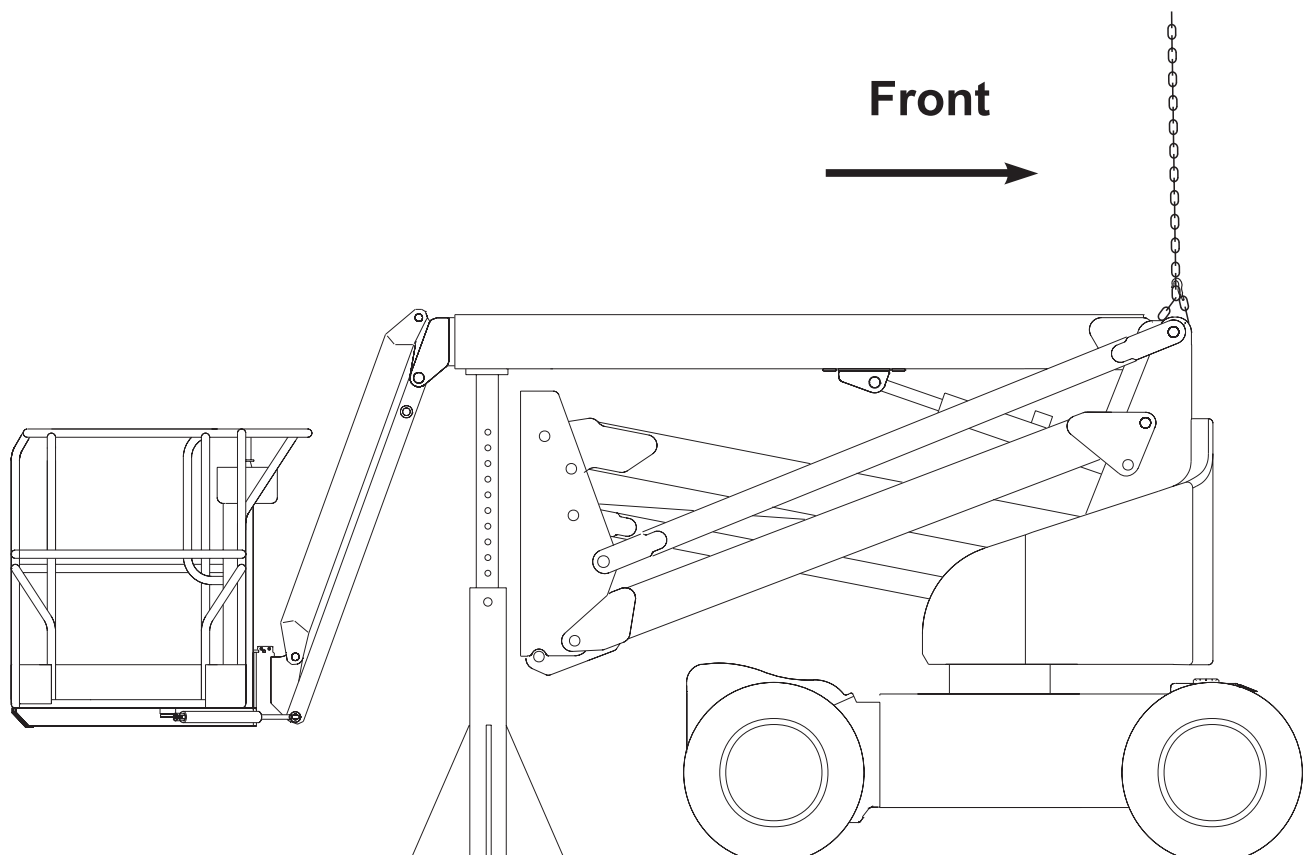


Figure 3-6: Blocking Elevating Assembly

3.7 BATTERY MAINTENANCE

Battery Charging

! WARNING !

Hazard of explosive gas mixture. Keep sparks, flame, and smoking material away from battery. Always wear safety glasses when working with batteries.

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

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

! WARNING !

Charge the battery only in a well-ventilated area.

Do not charge the battery when the work platform is in an area containing sparks or flames.

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

Never leave the charger unattended for more than two days.

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

Keep the charger dry.

Battery Inspection and Cleaning

Check battery fluid level daily, especially if the work platform is being used in a warm, dry climate. If required, add distilled water ONLY. Use of tap water will shorten battery life.

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

Clean the battery when it shows signs of corrosion at the terminals or when electrolyte has overflowed during charging. Use a baking soda solution to clean the 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.

! WARNING !

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.

Charge battery as follows:

1. Check the fluid level. If the electrolyte level is lower than 10mm (3/8 in.) above the plates, add clean, distilled water only.
2. Connect the charger plug to a properly grounded outlet of the proper voltage and frequency.
3. Use a charger that turns off automatically when the batteries are fully charged.

3.8 LUBRICATION

Refer to “Table 3-1” on page 3-5 for the lubrication intervals and Figure 3-7 for location of items that require lubrication service. Refer to the appropriate sections for lubrication information on the steering linkage, torque hubs, hydraulic oil, filter, and engine oil and filter.

Grease Fittings

Wipe each grease fitting before and after greasing. 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; wipe off any excess grease.

Hydraulic Oil And Filter

Fluid Level

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

Oil and Filter Replacement

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

CAUTION

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

2. Provide a suitable container to catch the drained oil.
3. Remove the drain plug and allow all oil to drain into the container. Be sure to dispose of oil properly.
4. Reinstall the drain plug.
5. Remove filter element from filter head (located beside valve block).
6. Apply a thin film of clean hydraulic oil (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 oil tank to operating level on sight gauge with ISO #46 hydraulic oil.

NOTE: For service information on the engine, refer to your engine manual (located in platform manual box or available from UpRight, Inc.).

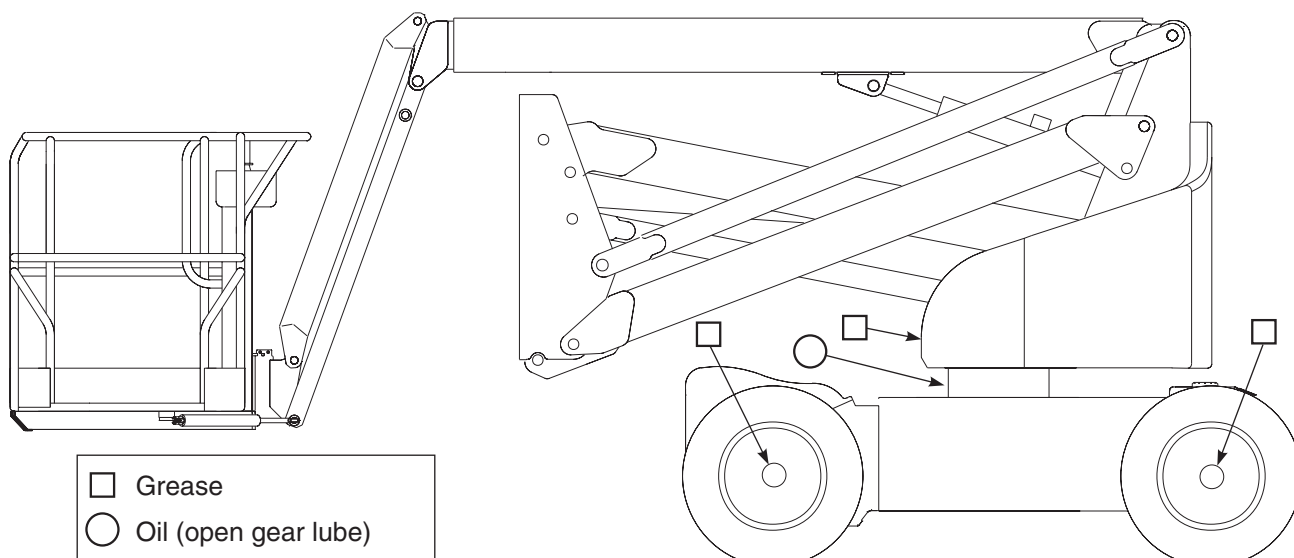


Figure 3-7: Lubrication Chart

3.9 PROPORTIONAL CONTROLLERS

Control Handle

1. If necessary, remove handle assembly from controller box.
2. Remove and replace defective parts.
3. If replacing PC board with resistor, note resistor adjustment (number of turns) and adjust new resistor to match old resistor setting.

NOTE: Check that pot operates correctly when handle is pushed completely forward and reverse.

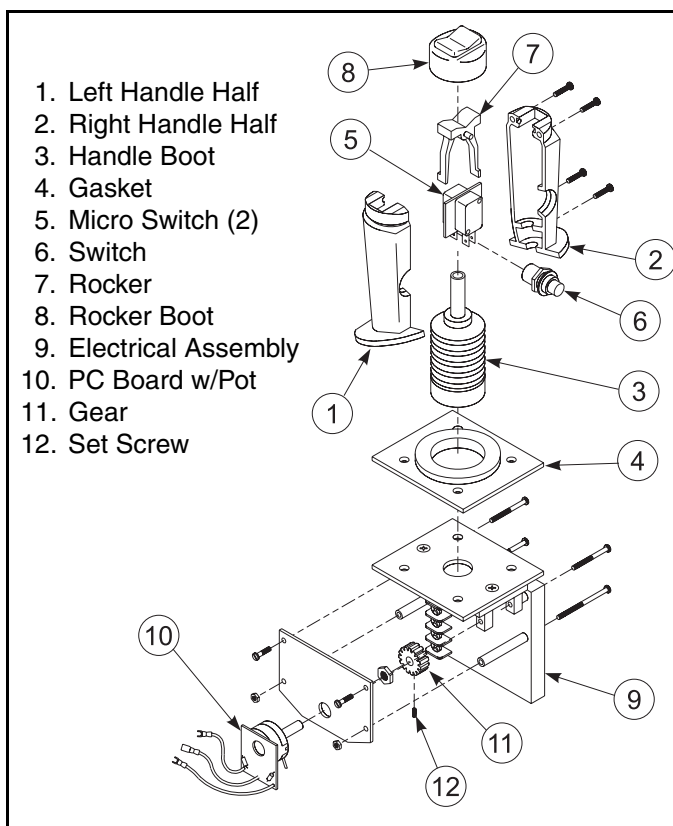


Figure 3-8: Proportional Controller

Refer to Section 6 for repair part numbers.

Proportional Control Adjustment

Potentiometers are sealed to protect sensitive adjustments from vibrations, or from tampering. Remove sealant prior to adjustment, and replace after.

NOTE: Do not use silicone sealer; it will damage pots.

Use a small screwdriver or special adjustment tool to set adjustment pots. Pots can be easily damaged.

Pots have 15 turns of adjustment; more than one turn will often be required to complete the adjustment. If pots have been previously set, reset by turning no more than 1 turn at a time. If they have not been previously set, preset to about mid-range and start from there.

Turn pot clockwise (CW) to increase settings.

Turn pot counterclockwise (CCW) to decrease settings.

Adjust pots only in sequence as outlined in this procedure.

Rotary Control for Boom Functions

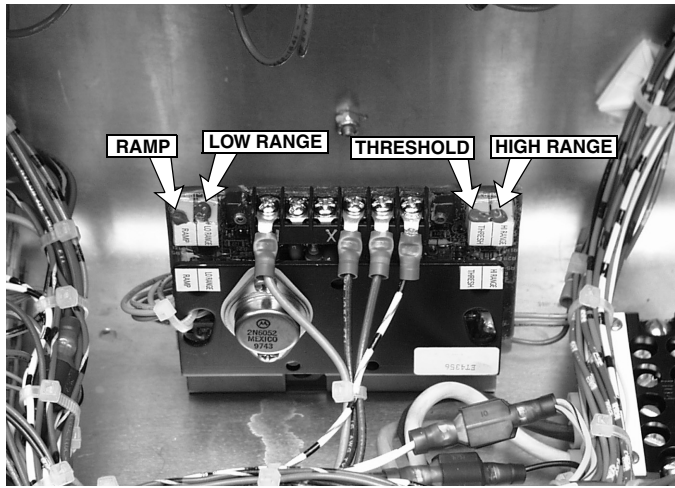


Figure 3-9: Rotary Control Adjustment, Upper Control Box

IMPORTANT: Back out ramp trimpot 10 turns (counterclockwise) before making any adjustments.

1. Verify that batteries are fully charged.
2. Connect ammeter in series at "A" terminal.
3. Set threshold at 1.00 amps or so upper boom elevates with rotary speed adjustment set on 2, and raise function switch actuated.
4. Set high range at 1.80 amps or so upper boom functions operate with speed adjustment on 9 or highest speed position. Check for proportional valve vibration. Valve is fully closed when it does not vibrate when energized. Do not over-adjust.
5. Set low range at 1.15 amps or so machine slews 180 degrees in 45 seconds with speed control set at position 9 or full speed.
6. Turn ramp trimpot back in 10 turns. Set ramp trimpot until machine has a smooth start or upper boom delays 2 seconds with raise switch actuated and speed control set at position 9 or full speed.

Proportional Drive Control

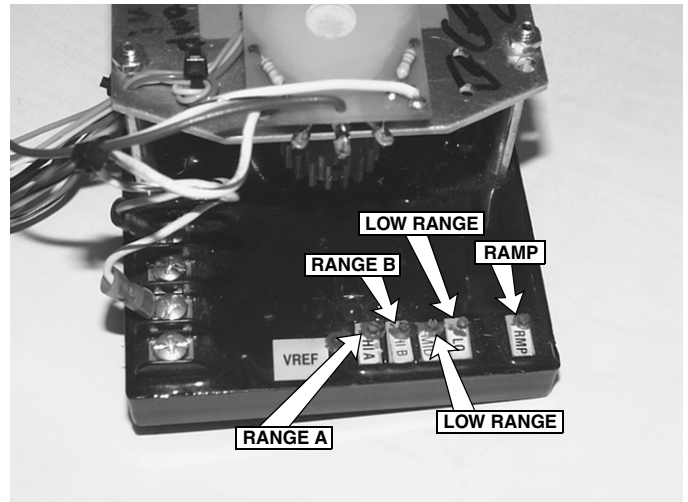


Figure 3-10: Proportional Control Adjustment, Upper Control Box

IMPORTANT: Back out ramp trimpot 10 turns counterclockwise before making any adjustments.

Adjusting one pot affects the setting of others. After making all adjustments, recheck each function to verify settings.

1. Adjust threshold pot at .45 amps or so machine barely creeps as first LED lights.
2. Adjust A, B pot at 1.15-1.20 amps or so machine travels 40' in six seconds.
3. Adjust mid pot so machine travels one foot per second when the platform is elevated.
4. Turn ramp back in 10 turns and adjust until machine stops in 0,6m to 0,9m (2 to 3 feet) from full speed when control handle is released.

3.10 PLATFORM DOWN LIMIT SWITCH

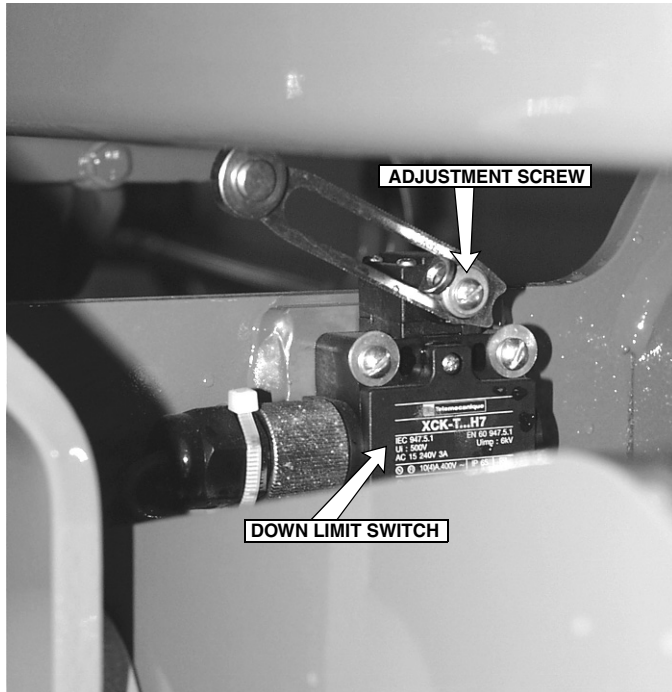


Figure 3-11: Platform Down Limit Switch

The Platform Down Switch bypasses the tilt sensor when the platform is fully lowered and closes the circuit to the Platform Down Relay, which allows high speed travel, cage trim function, and turret rotation.

! WARNING !

DO NOT attempt to adjust limit switches without first blocking the elevating assembly.

1. Lower the platform completely.
2. With the Platform/Chassis switch on CHASSIS, push the tilt sensor base to test the alarm circuit.
3. If the alarm sounds, elevate the platform and adjust the position of the switch arm by loosening the adjustment screw and repositioning the arm. Lower the platform and retest. If down limit switch is properly adjusted, the tilt alarm will not sound.
4. With platform elevated, repeat step 2. When switch is properly adjusted, alarm will sound.

3.11 TILT SENSOR

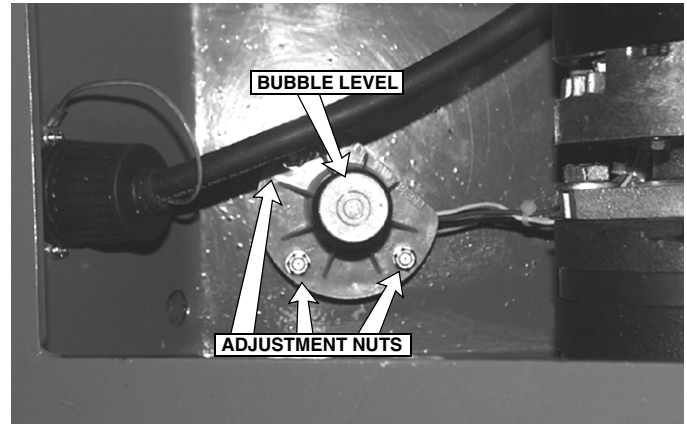


Figure 3-12: Tilt Sensor

The tilt sensor has four wires: red-power (12v in); black-ground; white-output (12v out); and green (to controller). To verify the sensor is working properly there are two LEDs under the sensor; green indicates the sensor is on (has power), red indicates the sensor is level and the white wire is 'hot' (12v out).

1. Check tires for proper pressure.
2. Place machine on firm, level surface.
3. Use inclinometer to ensure that the front and rear of the chassis are level.
4. Adjust the three leveling locknuts until the bubble is centered in the circle on the attached bubble level.
5. Elevate the platform until down limit switch opens and push the tilt sensor base to test the alarm circuit. Alarm should sound.

3.12 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 manifold block.

Disassembly

NOTE: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 3-13 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.
2. Remove spool valve cover and spool valve.
3. Remove solenoid valves, lift relief valve, counterbalance valves, and divider combiner valve.
4. Remove fittings, plugs, springs, balls and orifices.

Cleaning and Inspection

1. Wash the manifold in cleaning solvent to remove built-up contaminants and 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.

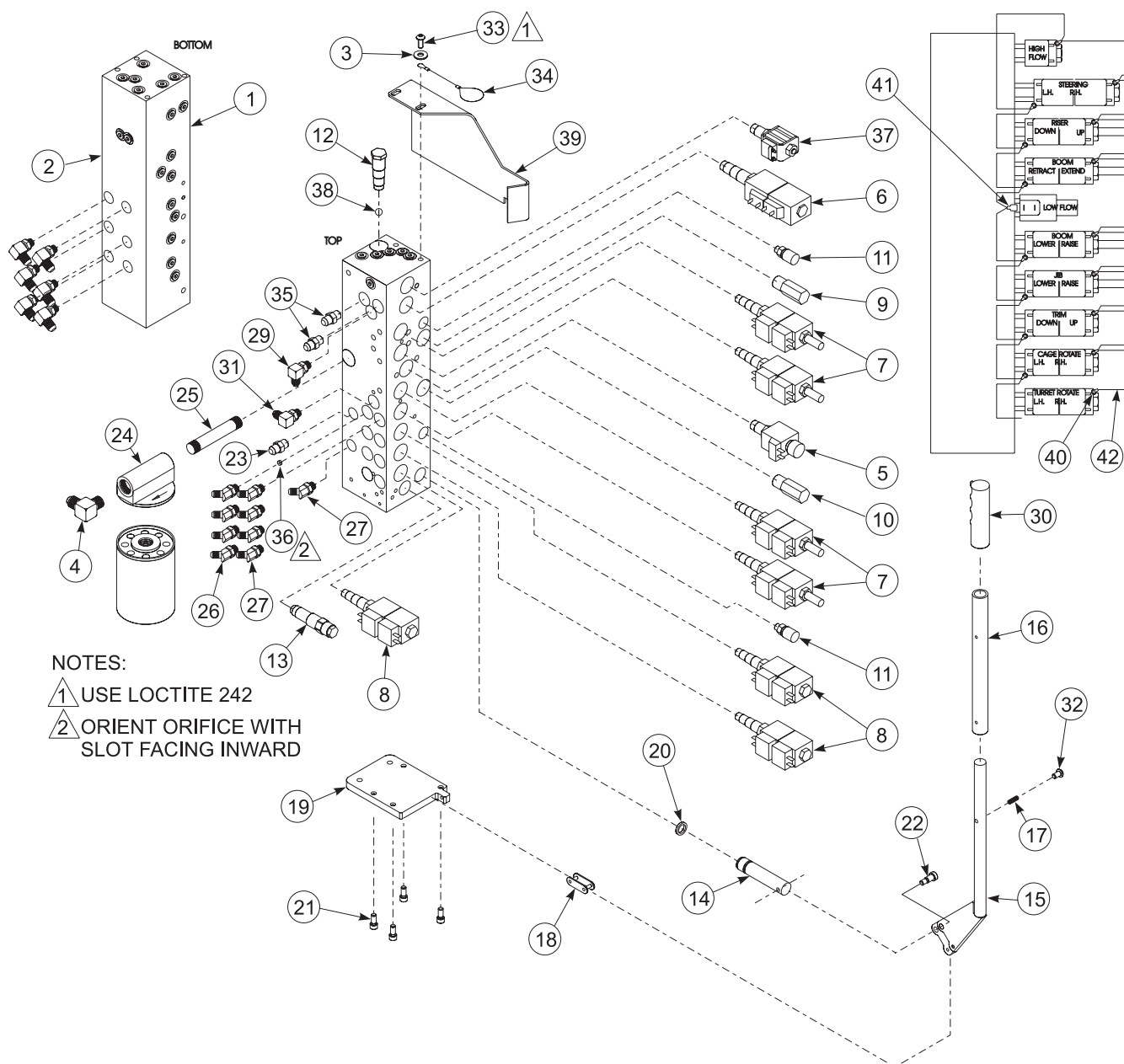
Assembly

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 Locktite #242 on each screw-in orifice.
2. Install solenoid valves, lift relief valve, counterbalance valves, divider combiner valve, and spool valve.
3. Install coils on solenoid valves.

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. Plug in batteries.
5. Operate each hydraulic function and check for proper operation and leaks.
6. Adjust lift relief and counterbalance valve pressures according to instructions in Section 3.14.



NOTE: Refer to Section 5 for a listing of hydraulic valve ports.

- | | | | |
|------------------------|----------------------|---------------------|----------------------|
| 1. Valve Block | 12. Diverter Valve | 23. Fitting | 34. Lanyard |
| 2. Fitting | 13. Counterbalance | 24. Filter Assembly | 35. Fitting Adapter |
| 3. Washer, 5/16 Flat | 14. Piston | 25. Nipple | 36. Orifice |
| 4. Fitting, Elbow | 15. Lever | 26. Fitting, Elbow | 37. High Flow Valve |
| 5. Low Flow Valve | 16. Extension | 27. Fitting, Elbow | 38. Steel Ball, 7/16 |
| 6. Steering Valve | 17. Detent | 28. Fitting, Elbow | 39. Bracket |
| 7. 4-Way Closed Center | 18. Pivot Link | 29. Fitting, Elbow | 40. Connector Ring |
| 8. 4-Way Motor Spool | 19. Mounting Plate | 30. Grip | 41. Connector Female |
| 9. Relief Valve | 20. Seal | 31. Fitting, Elbow | 42. Wire |
| 10. Relief Valve | 21. Screw, 5/16-18 | 32. Screw, 10-20 | |
| 11. Plug | 22. Screw, 3/8 x 5/8 | 33. Screw, 5/16-18 | |

Figure 3-13: Hydraulic Manifold, Exploded View

3.13 HYDRAULIC BRAKES

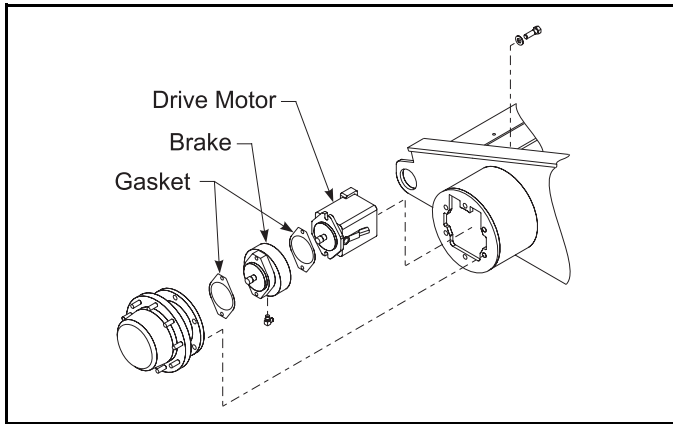


Figure 3-14: Rear Axle Assembly

Removal

1. Park the work platform on firm, level ground and block the front wheels to prevent the work platform from rolling.
2. Support rear of machine using jackstands.
3. Disconnect the hydraulic brake lines.
4. Tag and disconnect hydraulic lines to drive motors.

CAUTION

Clean all fittings before disconnecting the hose assemblies.

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

5. Remove wheel from machine.
6. Remove hardware which secures torque hub to chassis. Remove torque hub assembly from chassis.
7. Remove capscrews and washers holding the drive motor and brake to torque hub.
8. Remove the drive motor.
9. Remove the gasket and brake.

NOTE: Brake seal kit includes two gaskets.

NOTE: Torque all hardware to torques listed on page 3-25 unless otherwise specified.

Installation

1. Coat output shafts of brake and drive motor with high pressure molybdenum grease, and install gasket and brake onto torque hub.
2. Install gasket and drive motor. Align holes and install the two cap screws and lock washers.
3. Reinstall cables to drive motor and hoses to the brake.
4. Install the wheel. Torque the wheel nuts to 122 N-m (90 ft. lbs.).
5. Remove the jack stands and lower chassis to the ground.
6. Position chassis switch to parking brake release position. Alarm will sound.
7. Start the engine to energize brake hydraulic system.
8. Check for leaks and bleed air out of brake hydraulic system using bleed valve located on brake housing.

3.14 DRIVE PUMP SETTINGS

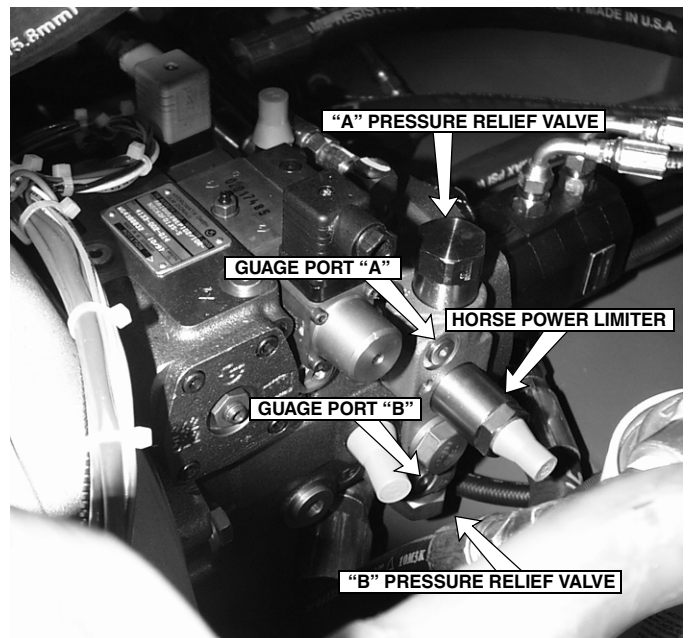


Figure 3-15: Hydraulic Pump

NOTE: Pump is properly adjusted at factory. Pump settings should only be checked if pump failure is suspected.

Pressure Override Valve

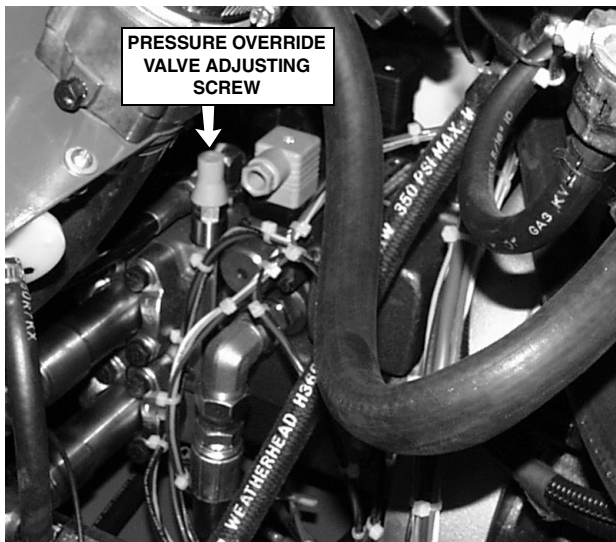


Figure 3-16: Pressure Override Valve

1. Position the machine on a level surface capable of supporting the machine on jackstands.
2. Using jackstands, raise the machine off the ground.
3. Connect 0-414 bar (0-6000 psi) pressure gauges at gauge port "A" and gauge port "B".
4. With engine running at normal operating RPM, position drive control handle to full forward.
5. Adjust pressure override valve so pressure gauge "A" reads 338 bar (4900 PSI). Turning pressure override adjustment screw clockwise increases pressure, and turning counterclockwise decreases pressure.
6. Position drive control handle to full reverse.
7. Check pressure reading on pressure gauge at "B". Pressure readings should be the same.

Main Relief Valves

Main relief valves "A" and "B" should be bench tested off the machine.

NOTE: Main relief valves should be adjusted to 365 bar (5300 PSI).

Pump Removal

1. Mark, disconnect, and plug the hose assemblies.
2. Mark and disconnect the electric cables.
3. Remove hardware which secures power unit and remove from chassis.

Pump Installation

1. Install power unit using hardware previously removed.
2. Unplug and reconnect the hydraulic hoses.
3. Reconnect the electric cables.
4. Fill the tank with clean hydraulic fluid.
5. Check the oil level in the hydraulic tank before operating the work platform.
6. Operate the pump and check for leaks and proper operation.
7. Replenish hydraulic fluid if necessary.

IMPORTANT: If replacing the pump, be sure the pump and hydraulic tank are filled with oil before starting the engine. Damage to the pump may occur if it is run without first being filled with oil.

3.15 FRONT DRIVE MOTOR REMOVAL

1. Park the work platform on firm, level ground.
2. Mark and remove the brake lines.
3. Mark and remove the drive motor hydraulic lines.

CAUTION

Clean all fittings before disconnecting the hose assemblies.

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

4. Remove the cap screws and washers that secure the drive motor to the torque hubs.
5. Remove the drive motor.

3.16 REAR DRIVE MOTOR REMOVAL

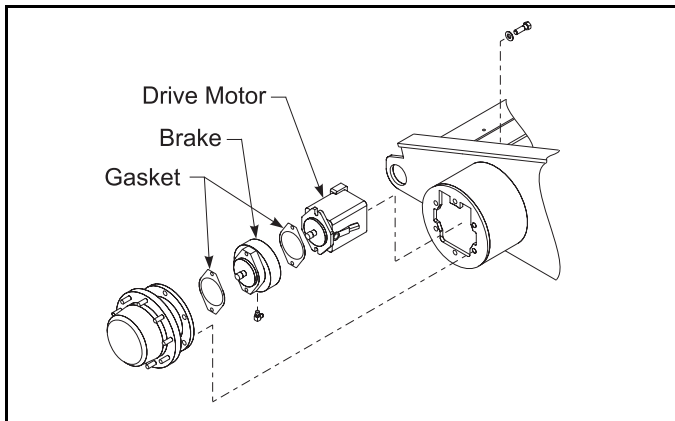


Figure 3-17: Rear Axle Assembly

1. Park the work platform on firm, level ground and block the front wheels to prevent the work platform from rolling.
2. Support rear of machine using jackstands.
3. Disconnect the hydraulic brake lines.
4. Tag and disconnect hydraulic lines to drive motors.

CAUTION

Clean all fittings before disconnecting the hose assemblies.

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

5. Remove the cap screws and washers which secure the drive motor to the torque hub. Remove the drive motor.

NOTE: Torque all hardware to torques listed on page 3-25 unless otherwise specified.

Assembly

1. Assembly is reverse of disassembly.
2. Apply grease to one side of thrust plate to hold it in place.
3. Using clean hydraulic oil, thoroughly lubricate and install cylinder block assembly. Install retaining ring.

Installation

NOTE: Torque all hardware to torques listed on page 3-25 unless otherwise specified.

1. Install motor using hardware previously removed.
2. Install hydraulic oil lines.
3. Operate machine slowly for a short time to clear air from hydraulic system. If necessary, replenish oil tank.
4. Check for leaks.
5. Operate machine to check for proper motor operation.

Drive Motor Seal Replacement

Early Model AB46RT

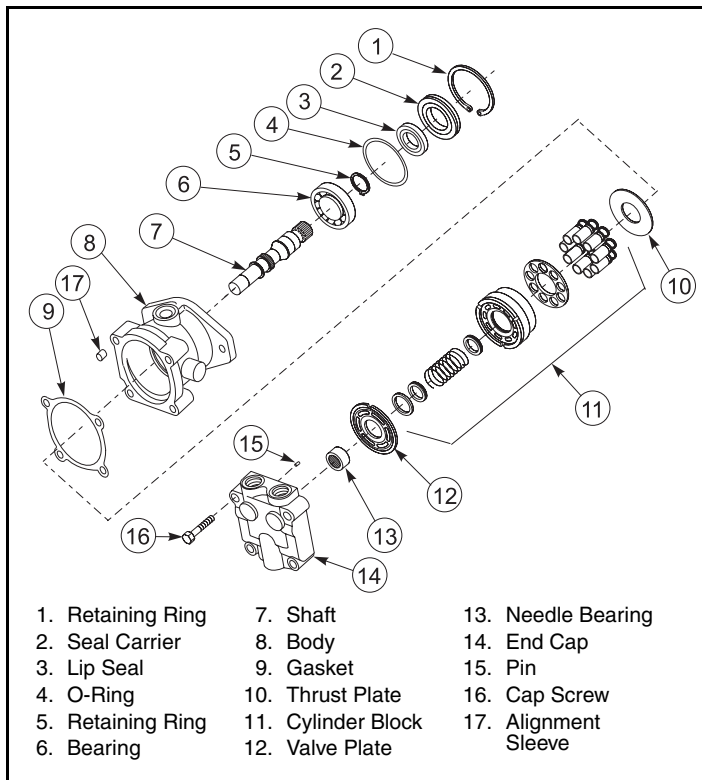


Figure 3-18: Early Model Drive Motor - Sauer Sundstrand

NOTE: Refer to Section 6 for available repair parts.

Disassembly

CAUTION: Safety glasses should be used during disassembly of hub.

1. Remove four cap screws which secure end cap. Remove end cap with valve plate. Do not allow valve plate to fall off end cap.
2. Carefully remove valve plate. It may be necessary to pry valve plate off with small screwdriver.
3. Remove the gasket.
4. Remove the alignment sleeves from housing.
5. Lay the motor on its side and remove cylinder block assembly.
6. Remove slipper guide and piston assemblies from cylinder block.
7. Using an O-ring pick, remove the thrust plate.
8. Remove the retaining ring. Remove the shaft and seal carrier with the seal.
9. Remove the O-ring from the seal carrier and remove the seal.

10. Remove small retaining ring and press the bearing off the shaft.

Closely examine all parts for pitting and wear. If pistons or cylinders are worn or pitted, replace cylinder block assembly.

If needle bearing is to be replaced, remove needle bearing using a puller. Press new bearing in place.

Bearing cage will protrude from end cap and serve as a pilot for the valve plate.

Replace all Gaskets and O-rings. Lubricate O-rings using petroleum jelly.

Drive Motor Assembly

1. Assembly is reverse of disassembly
2. Apply grease to one side of thrust plate to hold it in place.
3. Using clean hydraulic oil, thoroughly lubricate and install cylinder block assembly. Install retaining ring.

Installation

NOTE: Torque all hardware to torques listed on page 3-25 unless otherwise specified.

1. Install motor using hardware previously removed.
2. Install hydraulic oil lines.
3. Operate machine slowly for a short time to clear air from hydraulic system. If necessary, replenish oil tank.
4. Check for leaks.
5. Operate machine to check for proper motor operation.

Drive Motor Seal Replacement

Late Model AB46RT

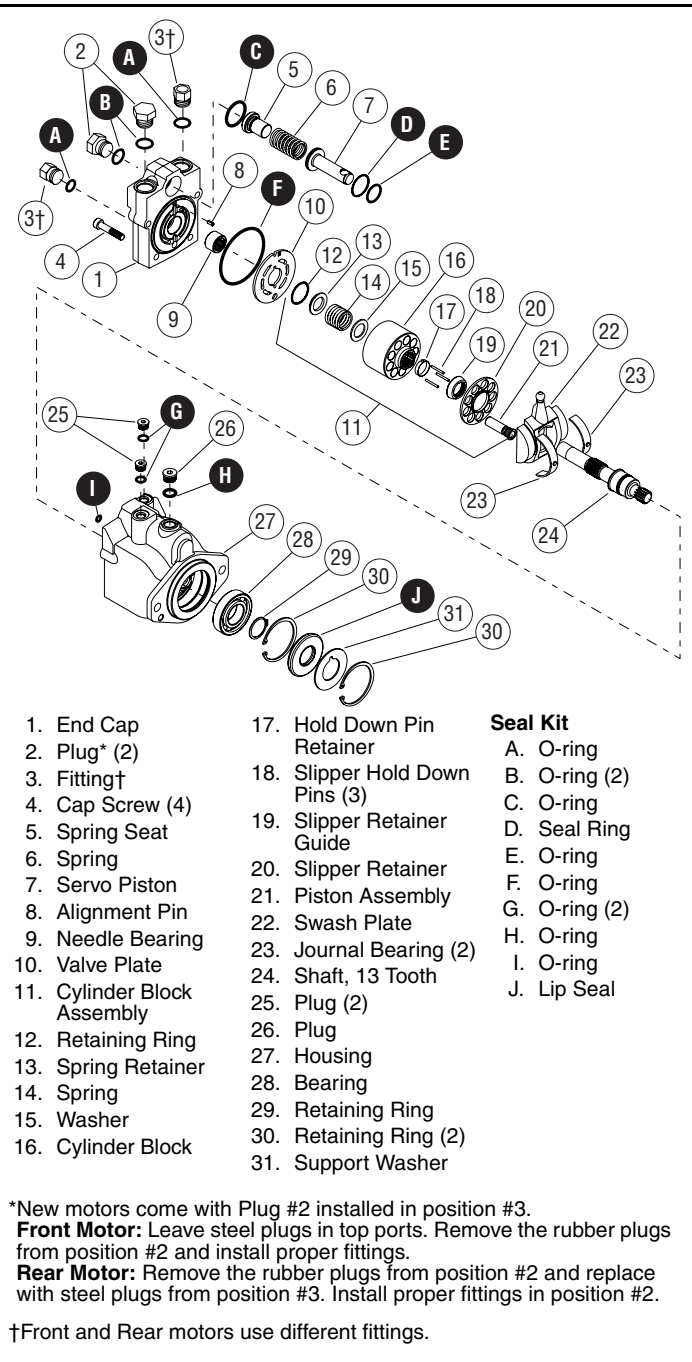


Figure 3-19: Late Model Drive Motor - Sauer Danfoss

NOTE: Refer to Section 6 for available repair parts.

Disassembly

CAUTION: Safety glasses should be used during disassembly of hub.

1. Remove four cap screws which secure end cap. Remove end cap with valve plate. Do not allow valve plate to fall off end cap.
2. Carefully remove valve plate. It may be necessary to pry valve plate off with small screwdriver.
3. Remove the gasket.
4. Remove the alignment pin from housing.
5. Lay the motor on its side and remove cylinder block assembly.
6. Remove slipper retainer and piston assemblies from cylinder block.
7. Remove the swash plate and journal bearings.
8. Remove the shaft
9. Remove the retaining ring and support washer
10. Remove the lip seal and inner retaining ring.
11. Remove small retaining ring and press the bearing off the shaft.

Closely examine all parts for pitting and wear. If pistons or cylinders are worn or pitted, replace cylinder block assembly.

If needle bearing is to be replaced, remove needle bearing using a puller. Press new bearing in place.

Bearing cage will protrude from end cap and serve as a pilot for the valve plate.

Replace all Gaskets and O-rings. Lubricate O-rings using petroleum jelly.

Drive Motor Assembly

1. Assembly is reverse of disassembly
2. Apply grease to one side of thrust plate to hold it in place.
3. Using clean hydraulic oil, thoroughly lubricate and install cylinder block assembly. Install retaining ring.

Installation

NOTE: Torque all hardware to torques listed on page 3-25 unless otherwise specified.

1. Install motor using hardware previously removed.
2. Install hydraulic oil lines.
3. Operate machine slowly for a short time to clear air from hydraulic system. If necessary, replenish oil tank.
4. Check for leaks. Operate machine to check for proper motor operation.

3.17 TORQUE HUBS

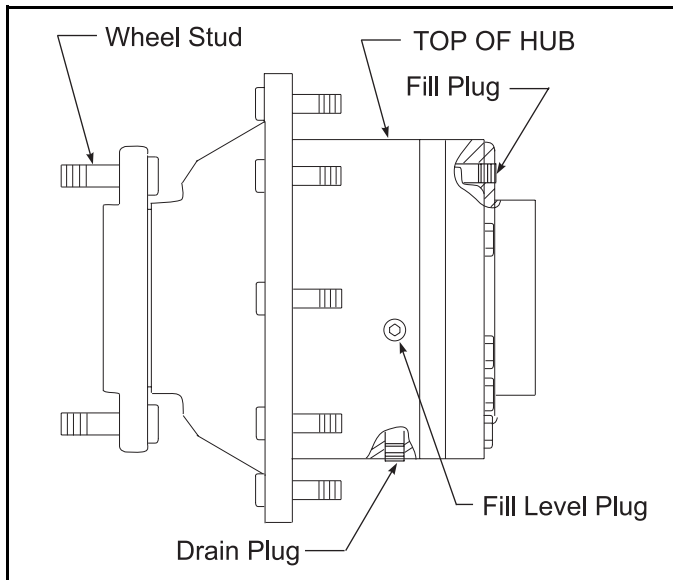


Figure 3-20: Torque Hub

NOTE: Change oil in torque hubs after the first 50 hours of operation. Change every 2000 hours thereafter.

1. Remove torque hub from drive assembly (refer to "Removal" section).
2. Remove drain plug from underside of torque hub and drain oil from unit.
3. Replace drain plug.
4. Remove fill plug from top side of torque hub.
5. Remove fill level plug from side of hub.
6. Fill unit with 90 wt. gear oil until oil comes out fill level plug opening (1/2 full).
7. Replace fill level plug. Replace fill plug.
8. Replace torque hub.

Removal

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

8. Remove 90° fitting from side of torque hub.
9. Mark and remove hoses from drive motor.
10. Remove mounting bolts from drive motor.
11. Separate drive motor from brake. Discard gasket.
12. Separate brake from torque hub. Discard gasket.

NOTE: New gaskets are available in brake seal kit.

13. Remove 1/2-20 nuts and washers from torque hub.
14. Remove torque hub.

IMPORTANT: Note location of 90° fitting on torque hub body. Hub must be installed with fitting in same position.

Installation

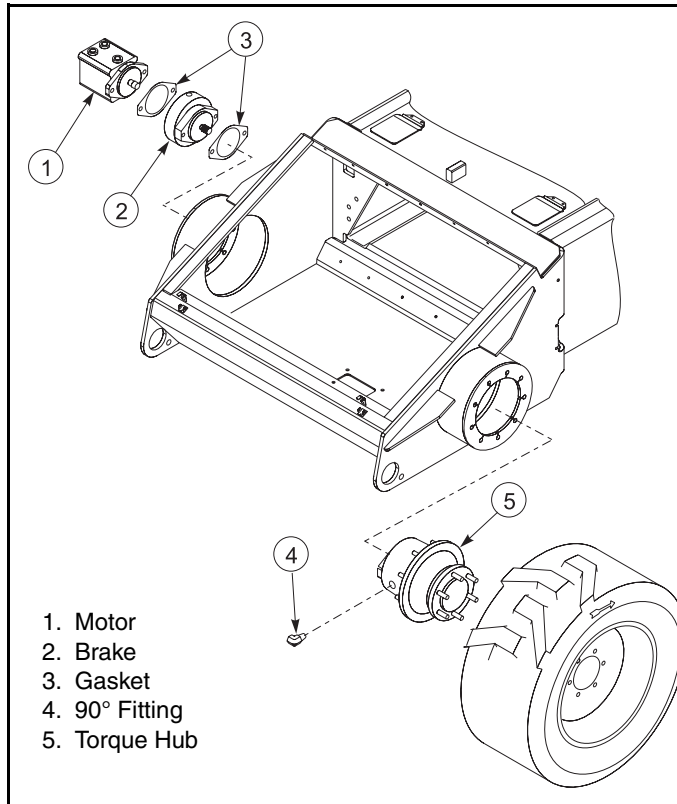


Figure 3-21: Torque Hub Assembly

IMPORTANT: Hub must be installed with 90° fitting in same position as when it was removed.

NOTE: Torque all hardware to torques listed on page 3-25 unless otherwise specified.

1. Install torque hub using 1/2-20 nuts and 1/2 washers.
2. Remove plug from 90° fitting and install fitting in side of torque hub. Point fitting towards rear of hub.
3. Using SAE 90W weight gear lube with EP additive, fill torque hub through top plug hole in rear cover until oil comes out of 90° fitting in side. Plug 90° fitting and top of rear cover.
4. Install new gasket and brake.
5. Install new gasket and drive motor.
6. Secure assembly, using washers and bolts.
7. Connect hydraulic brake lines.
8. Connect hoses to drive motor.
9. Install wheels. Torque lug nuts to 123 Nm (90 ft. lbs.).
10. Bleed brake lines if necessary.
11. Remove jackstands and lower rear end.
12. Connect battery terminal.
13. Check function of brake.

3.18 SETTING HYDRAULIC PRESSURES

Boom Valve Block

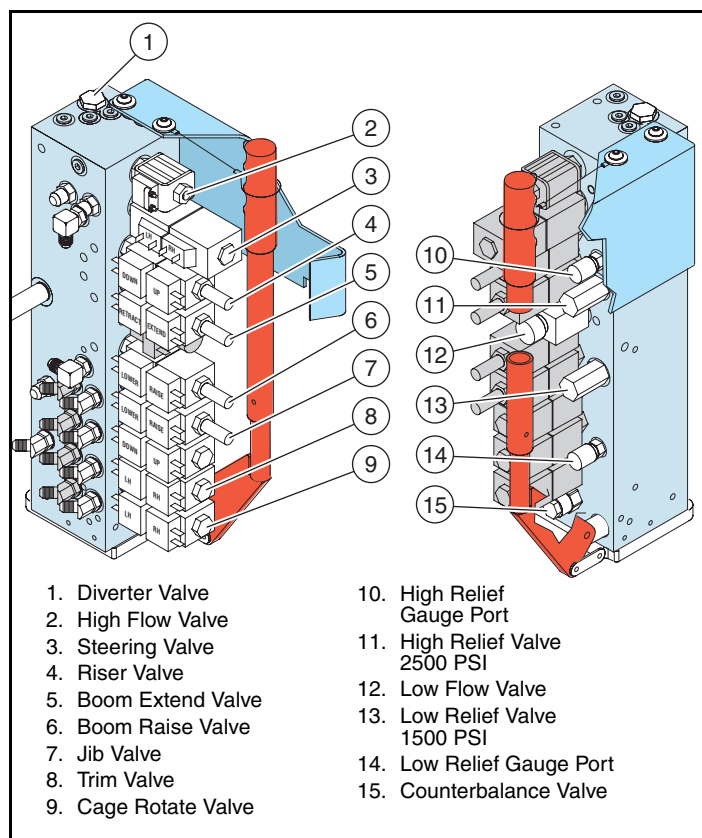


Figure 3-22: Boom Valve Block

Figure 3-8 shows complete hydraulic manifold assembly.

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

High Relief Valve

1. Operate the hydraulic system 10-15 minutes to warm the oil.
2. Remove the high relief port plug and install a 0-207 bar (0-3000 psi) pressure gauge assembly.
3. Remove the plug in the end of the high relief valve to expose the adjusting screw.
4. Operate jib raise function until jib is completely raised.
5. While activating the jib raise switch, set the pressure to 173 bar (2500 PSI) maximum by slowly turning the adjusting screw. Turning the adjusting screw clockwise increases pressure, and counterclockwise decreases pressure.
6. Remove the pressure gauge and reinstall all plugs.

Low Relief Valve

1. Operate the hydraulic system 10 - 15 minutes to warm the oil.
2. Remove the low relief port plug and install a 0-207 bar (0-3000 psi) pressure gauge assembly.
3. Remove the plug in the end of the low relief valve to expose the adjusting screw.
4. Turn the low relief valve adjustment screw counterclockwise two full turns.
5. Operate jib lower function until jib is completely lowered.
6. While activating the jib lower switch, set the pressure to 104 bar (1500 PSI) maximum by slowly turning the adjusting screw. Turning the adjusting screw clockwise increases pressure, and counterclockwise decreases pressure.
7. Remove the pressure gauge and reinstall all plugs.

Counterbalance Relief Valves

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

Drive Valve Block

The drive block is located inside the engine compartment on the right side. The early model drive block has four valves on top. The late model drive block has three valves on top.

Pressure Settings

Drive valve block components are pre-set and can not be adjusted.

Early Model AB46RT

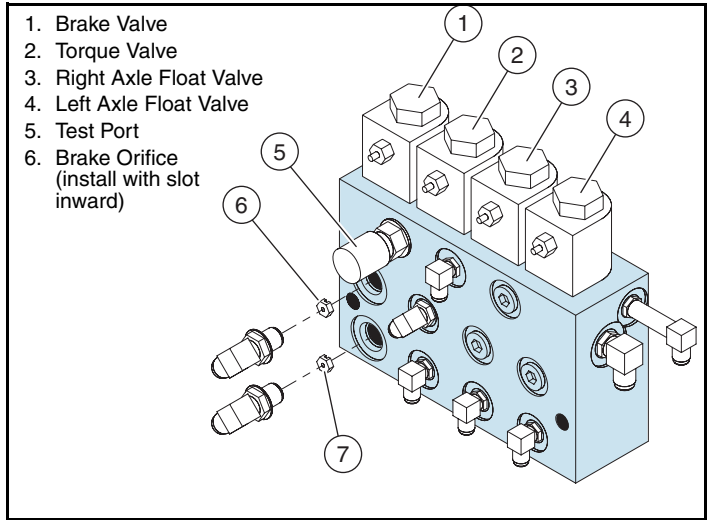


Figure 3-23: Drive Valve Block - 4-Valve

Late Model AB46RT

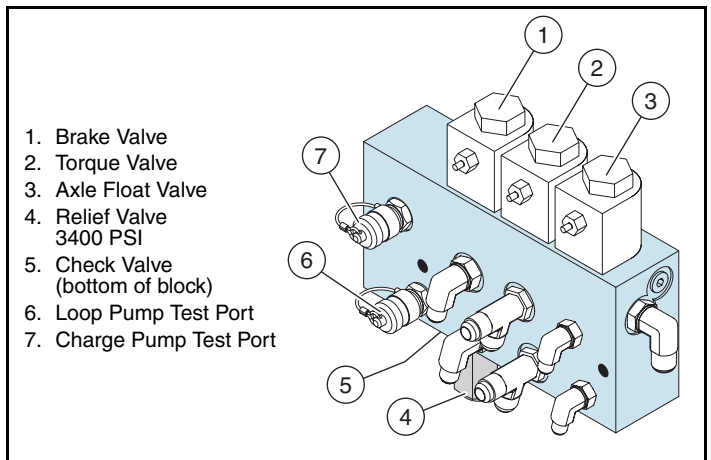


Figure 3-24: Drive Valve Block - 3-Valve

3.19 CYLINDER REPAIR

Removal

1. Remove cylinder from machine.

Note: Refer to “Illustrated Parts Section” for location of cylinder and list of parts which secure cylinder.

Note: If necessary, refer to “3.6 Blocking Elevating Assembly” on page 3-6.

2. Mark and disconnect hoses and IMMEDIATELY cap the openings to prevent contamination.

WARNING

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

Disassembly

1. Remove head from cylinder body.
2. Carefully slide rod assembly out of cylinder.
3. Remove seal kit components (wipers, rod seals, O-rings and backup rings) from 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 be replaced.

Assembly

Note: Torque all hardware to torques listed on Page 3-26 unless otherwise specified.

1. Lubricate all components with clean hydraulic fluid.

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 cylinder.

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

Installation

1. Installation is reverse of removal.
2. Carefully remove elevating assembly support.
3. Slowly cycle cylinder several times to remove air from the hydraulic system.

Check for proper cylinder operation. Check hydraulic connections for leaks.

3.20 MASTER CYLINDER

Refer to “3.19 Cylinder Repair” on page 3-23 for disassembly/assembly instructions.

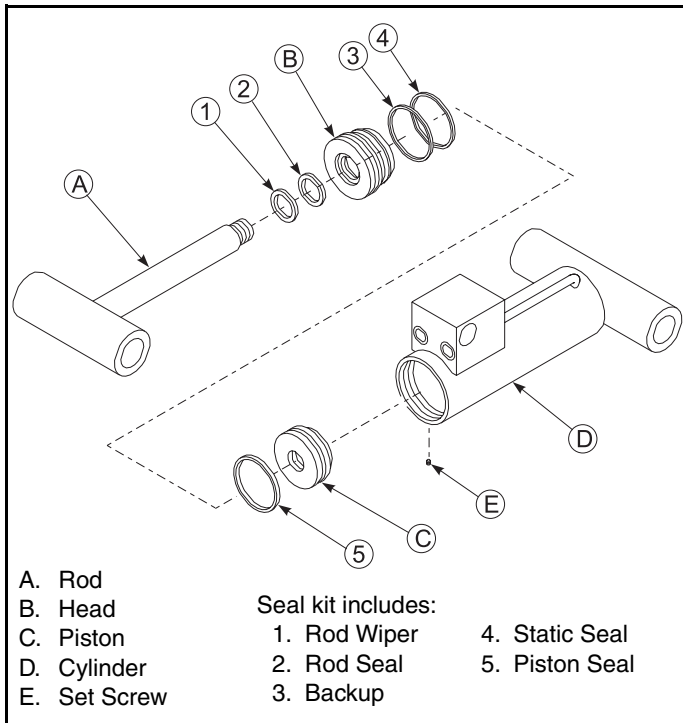


Figure 3-25: Master Cylinder

Removal

1. Raise elevating assembly until master cylinder pins are accessible.
2. Support the cage assembly (see Figure 3-6).
3. Remove rod end retaining bolt and rod end pin.
4. Mark and disconnect hoses and immediately cap the openings to prevent contamination.
5. Using a metal drift, remove rod end pin.
6. Remove base end pin retaining bolt and pin.
7. Carefully remove master cylinder.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.
2. Remove boom support.
3. Slowly raise and lower boom several times. Check hydraulic connections for leaks. Check for proper slave cylinder operation.

3.21 SLAVE CYLINDER

Refer to “3.19 Cylinder Repair” on page 3-23 for disassembly/assembly instructions.

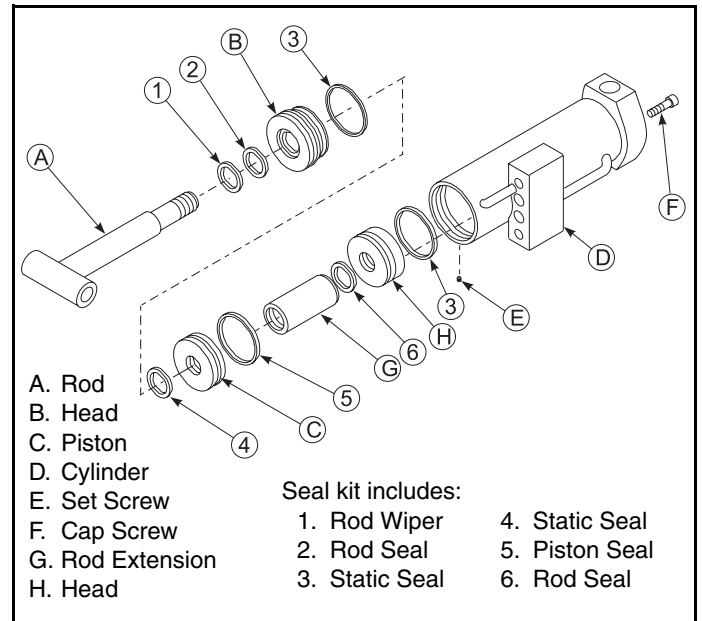


Figure 3-26: Slave Cylinder

Removal

1. Extend boom until slave cylinder trunnion pins are accessible. Support the cage assembly.
2. Remove rod end pin retaining bolt.
3. Mark and disconnect hoses and immediately cap the openings to prevent contamination.
4. Using a metal drift, remove rod end pin.
5. Remove trunnion pin retaining bolts, and using a pin puller, remove trunnion pins.
6. Carefully remove slave cylinder.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.
2. Remove boom support.
3. Slowly raise and lower boom several times. Check hydraulic connections for leaks. Check for proper slave cylinder operation.

3.22 CAGE ROTATE CYLINDER

Refer to “3.19 Cylinder Repair” on page 3-23 for disassembly/assembly instructions.

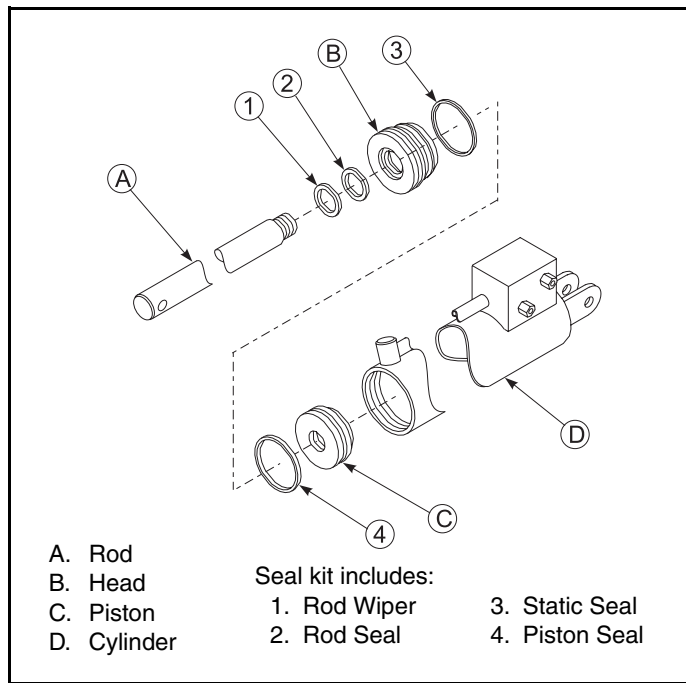


Figure 3-27: Cage Rotate Cylinder

Removal

1. Support the cage assembly at a convenient working height.
2. Mark and disconnect hoses and immediately cap the openings to prevent contamination.
3. Remove hardware which secures cage rotate cylinder. Remove cage rotate cylinder.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.
2. Slowly cycle cage rotate cylinder several times. Check hydraulic connections for leaks. Check for proper cylinder operation.

3.23 STEERING CYLINDER

Refer to “3.19 Cylinder Repair” on page 3-23 for disassembly/assembly instructions.

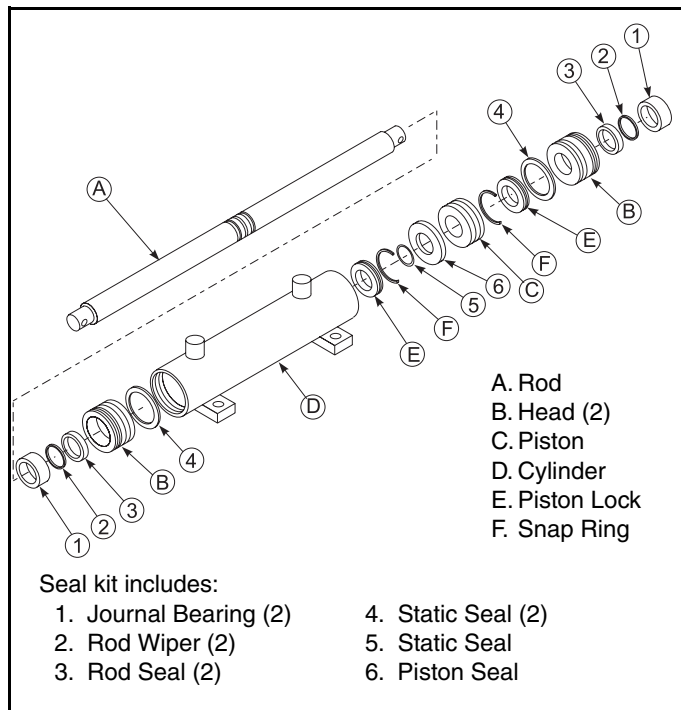


Figure 3-28: Steering Cylinder

Removal

1. Mark and disconnect hoses and immediately cap the openings to prevent contamination.
2. Remove hardware which secures the steering arms to the spindles.
3. Remove hardware which secures steering cylinder to the chassis. Remove steering cylinder.
4. Mark steering arms for position on cylinder. Remove hardware which secures steering arms to rod ends. Using a hammer and drift, remove the roll pins which secure the steering arms to the rod ends.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.
2. Slowly cycle steering cylinder several times. Check hydraulic connections for leaks. Check for proper cylinder operation.

3.24 JIB CYLINDER

Refer to “3.19 Cylinder Repair” on page 3-23 for dis-assembly/assembly instructions.

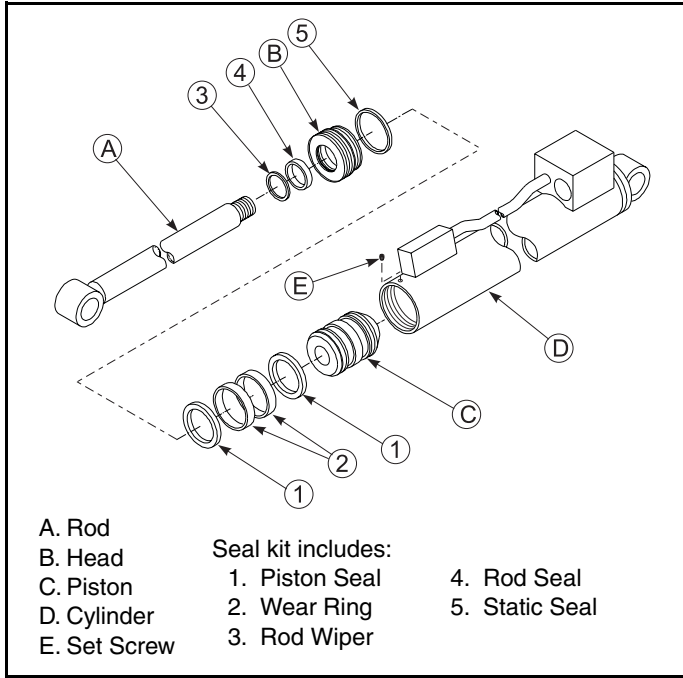


Figure 3-29: Jib Cylinder

Removal

1. Using an overhead hoist or crane, support the cage assembly at a convenient working height.
2. Mark and disconnect hoses and immediately cap the openings to prevent contamination.
3. Remove hardware which secures jib cylinder pins.

NOTE: Jib cylinder is heavy. Take appropriate measures to support cylinder.

4. Remove jib cylinder pins. Remove jib cylinder.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.
2. Slowly cycle jib cylinder several times. Check hydraulic connections for leaks. Check for proper cylinder operation.

3.25 BOOM RAISE & BOOM RISER CYLINDERS

Refer to “3.19 Cylinder Repair” on page 3-23 for dis-assembly/assembly instructions.

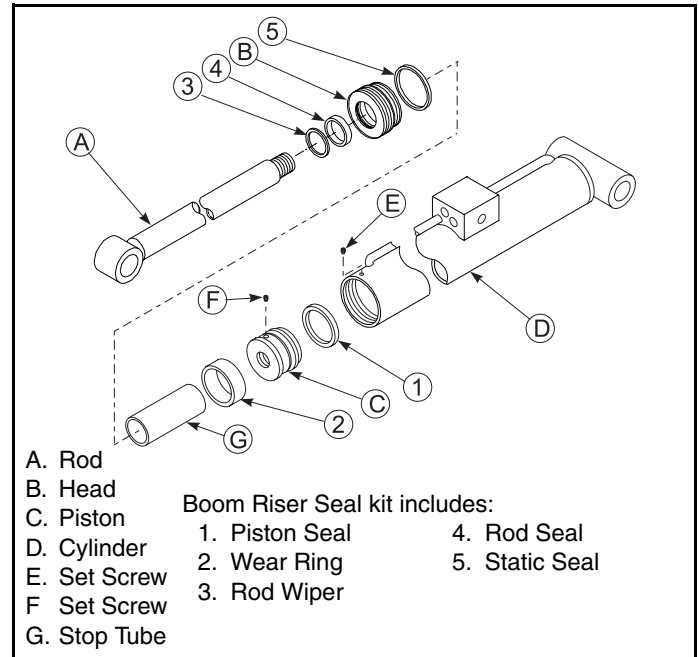


Figure 3-30: Boom Riser Cylinder

Removal

1. Raise elevating assembly until cylinder pins are accessible.
2. Support the elevating assembly (see Figure 3-6).
3. Mark and disconnect hoses and immediately cap the openings to prevent contamination.
4. Remove hardware which secures cylinder. Remove cylinder.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.
2. Slowly cycle cylinder several times. Check hydraulic connections for leaks. Check for proper cylinder operation.

3.26 BOOM EXTEND CYLINDER

Refer to “3.19 Cylinder Repair” on page 3-23 for disassembly/assembly instructions.

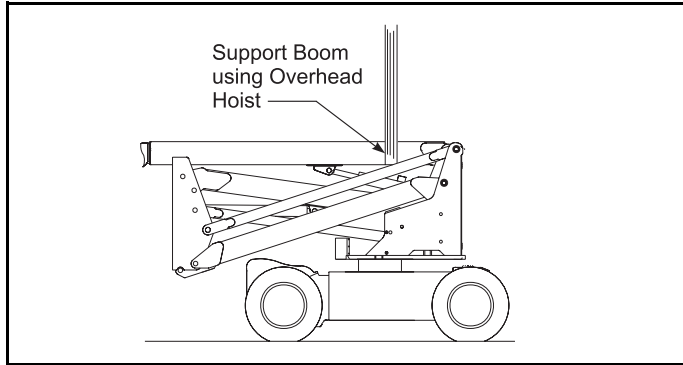


Figure 3-31: Removing Boom Extend Cylinder

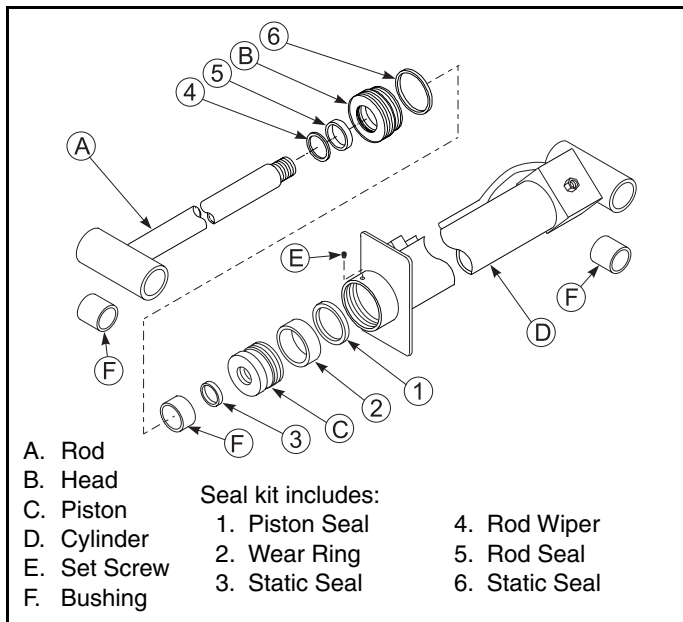


Figure 3-32: Boom Extend Cylinder

Removal

1. Lower boom completely. Extend boom until front boom extend cylinder pin is accessible.
2. Use an overhead hoist or crane to support the rear of the boom (see Figure 3-31).
3. Remove rear boom pivot pin.
4. Remove clips which secure front boom extend cylinder pin. Remove pin.
5. Mark and disconnect boom extend cylinder hoses and immediately cap the openings to prevent contamination.
6. Using overhead hoist, slightly raise rear of boom.

NOTE: This will extend master cylinder and allow room to remove boom extend cylinder. It may be necessary to remove a counterbalance valve to allow master cylinder to expand.

7. Remove rear boom extend cylinder pin. Carefully remove boom extend cylinder. Measure length of expanded boom cylinder.

IMPORTANT: Boom extend cylinder must be expanded to the same length when it is reinstalled.

Installation

1. Follow steps from “Removal” section in reverse order to install cylinder.

IMPORTANT: Boom extend cylinder must be expanded to the same length it was when it was removed.

2. Slowly cycle cylinder several times. Check hydraulic connections for leaks. Check for proper cylinder operation.

3.27 LONG-TERM STORAGE

If the work platform is to be placed in long-term storage (dead storage), follow these recommended preservation procedures.

Preservation

1. Clean painted surfaces. If paint is damaged, repaint.
2. Fill the hydraulic tank to operating level. Fluid will be visible at the sight gauge.

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

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

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. Service the engine according to the manufacturer's recommendations.
6. Remove the battery and place in alternative service.

3.28 TORQUE SPECIFICATIONS

Fasteners

Use the following values to torque fasteners used on UpRight Work Platforms unless a specific torque value is called out for the part being installed.

Hydraulic Components

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

NOTE: Always lubricate threads with clean hydraulic oil prior to installation.

Table 3-2: Torque Specifications for Fasteners







AMERICAN STANDARD CAP SCREWS									METRIC CAP SCREWS								
SAE GRADE	5				8				METRIC GRADE	8.8				10.9			
Cap Screw Size (inches)									Cap Screw Size (millimeters)	 				 			
	TORQUE				TORQUE					TORQUE				TORQUE			
	Ft./Lbs		Nm.		Ft./Lbs.		Nm.			Ft./Lbs.		Nm.		Ft./Lbs.		Nm.	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
1/4 - 20	6.25	7.25	8.5	10	8.25	9.5	11	13	M6 x 1.00	6	8	8	11	9	11	12	15
1/4 - 28	8	9	11	12	10.5	12	14	16	M8 x 1.25	16	20	21.5	27	23	27	31	36.5
5/16 - 18	14	15	19	20	18.5	20	25	27	M10 x 1.50	29	35	39	47	42	52	57	70
5/16 - 24	17.5	19	23	26	23	25	31	34	M12 x 1.75	52	62	70	84	75	91	102	123
3/8 - 16	26	28	35	38	35	37	47.5	50	M14 x 2.00	85	103	115	139	120	146	163	198
3/8 - 24	31	34	42	46	41	45	55.5	61	M16 x 2.50	130	158	176	214	176	216	238	293
7/16 - 14	41	45	55.5	61	55	60	74.5	81	M18 x 2.50	172	210	233	284	240	294	325	398
7/16 - 20	51	55	69	74.5	68	75	92	102	M20 x 2.50	247	301	335	408	343	426	465	577
1/2 - 13	65	72	88	97.5	86	96	116	130	M22 x 2.50	332	404	450	547	472	576	639	780
1/2 - 20	76	84	103	114	102	112	138	152	M24 x 3.00	423	517	573	700	599	732	812	992
9/16 - 12	95	105	129	142	127	140	172	190	M27 x 3.00	637	779	863	1055	898	1098	1217	1488
9/16 - 18	111	123	150	167	148	164	200	222	M30 x 3.00	872	1066	1181	1444	1224	1496	1658	2027
5/8 - 11	126	139	171	188	168	185	228	251	NOTE: These values apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used								
5/8 - 18	152	168	206	228	203	224	275	304									
3/4 - 10	238	262	322	355	318	350	431	474									
3/4 - 16	274	302	371	409	365	402	495	544									
7/8 - 9	350	386	474	523	466	515	631	698									
7/8 - 14	407	448	551	607	543	597	736	809									
1 - 8	537	592	728	802	716	790	970	1070									
1 - 14	670	740	908	1003	894	987	1211	1337									

Table 3-3: Torque Specifications for Hydraulic Components

Type: SAE Part Series	Cartridge Poppet		Fittings		Hoses	
	Ft/Lbs	Nm	Ft/Lbs	Nm	Ft/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

Section 4

TROUBLESHOOTING

4.1 INTRODUCTION

This section on troubleshooting provides guidelines on the types of problems users may encounter in the field, helps determine the cause of problems, and suggests proper corrective action.

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 Section 2.0 and 5.0 will aid in understanding the operation and function of the various components and systems of the AB46 and help in diagnosing and repair of the machine.

W A R N I N G

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

Unplug the machine or disconnect the battery when replacing or testing the continuity of any electrical component.

General Procedure

Use the charts on the following pages to help determine the cause of a fault in your UpRight AB46.

1. Verify your problem.
 - a. 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.
 - a. Use the troubleshooting guide to determine which components are common to all circuits that are not functioning correctly.
3. Identify the problem component.
 - a. 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.
 - a. 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.

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Table 4-1: Troubleshooting Guide - Hydraulic Schematic

1. High dump is not activated by steering. It will close for other functions while steering.													
2. Diverter valve is not activated during normal operation, only for hand pump operation.													
COMPONENT		FUNCTION	STEER	RISER	BOOM EXTEND	BOOM RAISE	JIB	CAGE LEVEL	CAGE ROTATE	SLEW	DRIVE	BRAKE RELEASE	FRONT AXLE
PMP2	Boom Pump		X	X	X	X	X	X	X	X			
V1	Steer Valve		X										
CYL1	Steer Cylinder		X										
RV1	High Relief		X	X	X	X	X	X	X	X			
CV2-8	Relief Check Valves		X	X	X	X	X	X	X	X	X	X	
V14	High Dump		X	X	X								
V15	Diverter Valve		X	X	X	X	X	X	X	X			
V2	Riser Valve			X									
CYL2	Riser Cylinder			X									
CB2	Riser C/B Valve			X									
V3	Boom Extend Valve				X								
CYL3	Boom Extend Cylinder				X								
CB3	Boom Extend C/B Valve				X								
V4	Boom Raise Valve					X							
CYL4	Boom Raise Cylinder					X							
CB4	Boom Raise C/B Valve					X							
V16	Proportional Valve					X	X	X	X	X			
V5	Jib Valve						X						
ORF16	Jib Orifice						X						
CYL5	Jib Cylinder						X						
CB5	Jib C/B Valve						X						
CYL6	Master Cylinder							X					
CB6	Master Cylinder C/B Valves							X					
CYL7	Slave Cylinder							X					
CB7	Slave Cylinder CB Valves							X					
V6	Trim Level Valve							X					
RV2	Low Relief Valve			X	X	X	X	X	X	X			
CYL8	Cage Rotate Cylinder								X				
V8	Cage Rotate Valve								X				
CB8	Cage Rotate C/B Valve								X				
MOT5	Slew Motor									X			
V9	Turret Rotate Valve									X			
CB1	1500 PSI Counterbalance									X			
PMP1	Loop Pump										X		
	Charge Pump										X	X	X
	Charge Pump Relief Valve										X	X	X
MOT1-4	Drive Motors										X		
V10	Brake Valve										X	X	
ORF11	Brake Orifices										X	X	
CYL9-10	Brake Cylinders										X	X	

Table 4-1: Troubleshooting Guide - Hydraulic Schematic (Continued)

1. High dump is not activated by steering. It will close for other functions while steering.													
2. Diverter valve is not activated during normal operation, only for hand pump operation.													
COMPONENT		FUNCTION	STEER	RISER	BOOM EXTEND	BOOM RAISE	JIB	CAGE LEVEL	CAGE ROTATE	SLEW	DRIVE	BRAKE RELEASE	FRONT AXLE
CYL11	Left Axle Cylinder												X
CYL12	Right Axle Cylinder												X
V11	Left Axle Valve												X
V12	Right Axle Valve												X
V13	Hi Torque Valve												X

Table 4-2: Troubleshooting Guide - Electrical Schematic

COMPONENT	FUNCTION	ENGINE RUN - UPPER CONTROLS	ENGINE RUN - LOWER CONTROLS	ENGINE START - UPPER CONTROLS	ENGINE START - LOWER CONTROLS	STEER RIGHT	STEER LEFT	RISER ELEVATE	RISER DESCEND	BOOM EXTEND	BOOM RETRACT	BOOM RAISE	BOOM LOWER	JIB UP	JIB DOWN	CAGE LEVEL UP	CAGE LEVEL DOWN	CAGE ROTATE CCW	CAGE ROTATE CW	SLEW CCW	SLEW CW	DRIVE	FRONT AXLE LOCK	PARKING BRAKE RELEASE	TILT ALARM	TILT LIGHT	TORQUE - HI / Low
Battery		X	X																								
25 A Fuse		X	X																								
Chassis EM Stop Switch		X	X																								
Chassis Key Switch		X	X																					X			
10 A Circuit Breaker CB1		X	X																								
Chassis Control Power Relay		X	X																								
Starter Motor / Solenoid		X	X																								
Start Solenoid		X	X																								
Alternator		X	X																								
10 Amp Circuit breaker CB2			X																								
Platform EM Stop Switch		X	X																								
10 Amp Control Box Fuse		X																									
Control Box Key Switch		X																									
Diode DB20R		X																									
Diode DB20L			X																								
Engine Relay Contacts and Coil		X	X																								
Tilt Relay Contacts		X	X																						X	X	
Tilt Light off for normal operation		X	X																								
Tilt Alarm off for normal operation		X	X																								
Brake Relay Contacts		X	X																								
Tilt Sensor (red wire)		X	X																								
Tilt Sensor (white wire)		X	X																						X	X	
Propane Relay contacts (Dual Fuel)		X	X																								
Gas Relay contacts (Dual Fuel)		X	X																								
Propane Prime Switch (Dual Fuel)		X	X																								
Engine Run Solenoid (Diesel)		X	X																								
Glow Plug Relay (Diesel)				X	X																						
Glow Plug Solenoid (Diesel)				X	X																						
Glow Plug (Diesel)				X	X																						
Glow Plug Resistor (Diesel)				X	X																						
Horn Relay contacts		X	X																								
Throttle Relay contacts		X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Down Limit Switch		X	X																				X				X
Down Relay coil		X	X																								
Engine Oil Pressure Switch		X	X																								
Distributor		X	X																								
Ignition Coil		X	X																								

TROUBLESHOOTING

Section 4.1

Table 4-2: Troubleshooting Guide - Electrical Schematic (Continued)

COMPONENT	FUNCTION	ENGINE RUN - UPPER CONTROLS	ENGINE RUN - LOWER CONTROLS	ENGINE START - UPPER CONTROLS	ENGINE START - LOWER CONTROLS	STEER RIGHT	STEER LEFT	RISE ELEVATE	RISE DESCEND	BOOM EXTEND	BOOM RETRACT	BOOM RAISE	BOOM LOWER	JIB UP	JIB DOWN	CAGE LEVEL UP	CAGE LEVEL DOWN	CAGE ROTATE CCW	CAGE ROTATE CW	SLEW CCW	SLEW CW	DRIVE	FRONT AXLE LOCK	PARKING BRAKE RELEASE	TILT ALARM	TILT LIGHT	TORQUE - HI / LOW
Fuel Select Switch		X	X																								
Propane Relay coil		X	X																								
LP Valve		X	X																								
Gas Relay coil		X	X																								
Gas Valve		X	X																								
Chassis Control Power Relay coil			X																								
Chassis Control Power Relay contacts		X	X																								
Start Solenoid				X	X																						
Starter Motor				X	X																						
Start Switch					X																						
Choke Switch				X	X																						
Choke Relay				X	X																						
Choke				X	X																						
Choke Diode				X	X																						
Throttle Relay Coil								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Throttle Solenoid								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Lower Turret Rotate Switch																				X	X						
Lower Cage rotate Switch																		X	X								
Lower Trim Switch																X	X										
Lower Jib Switch														X	X												
Lower Boom Elevate Switch												X	X														
Lower Boom Extend Switch										X	X																
Lower Riser Switch								X	X																		
Diode DB16														X	X	X	X	X	X	X	X						
Diode DB8														X	X	X	X	X	X	X	X						
Diode DB8.1														X	X	X	X	X	X	X	X						
Boom Speed Relay coil														X	X	X	X	X	X	X	X						
Boom Speed Relay contacts																											
Turtle / Rabbit Knob														X	X	X	X	X	X	X	X						
Diode DB17								X	X	X	X																
Diode DB18												X	X														
Foot Switch						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Boom Disconnect Relay																											
Upper Turret Rotate Switch																				X	X						
Upper Cage Rotate Switch																		X	X								
Upper Trim Switch																X	X										
Upper Jib Switch														X	X												
Lower Boom Elevate Switch												X	X														

Section 4.1

TROUBLESHOOTING

Table 4-2: Troubleshooting Guide - Electrical Schematic (Continued)

COMPONENT	FUNCTION	ENGINE RUN - UPPER CONTROLS	ENGINE RUN - LOWER CONTROLS	ENGINE START - UPPER CONTROLS	ENGINE START - LOWER CONTROLS	STEER RIGHT	STEER LEFT	RISE ELEVATE	RISE DESCEND	BOOM EXTEND	BOOM RETRACT	BOOM RAISE	BOOM LOWER	JIB UP	JIB DOWN	CAGE LEVEL UP	CAGE LEVEL DOWN	CAGE ROTATE CCW	CAGE ROTATE CW	SLEW CCW	SLEW CW	DRIVE	FRONT AXLE LOCK	PARKING BRAKE RELEASE	TILT ALARM	TILT LIGHT	TORQUE - HI / LOW
Upper Boom Extend Switch										X	X																
Upper Riser Switch								X	X																		
Turret Drive Relay contacts																		X	X	X	X						
Boom Disconnect Relay contacts								X	X	X	X	X	X	X	X												
Diode DB7														X	X	X	X	X	X	X	X						
Diode DB6												X	X														
Diode DB11														X	X	X	X	X	X								
Diode DB3								X	X	X	X																
Diode DB2								X	X	X	X																
Diode DB9												X	X														
Diode DB23L						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Diode DB23R																						X					
Diode DB24																									X		
Speed Control Knob												X	X	X	X	X	X	X	X	X	X						
Boom Speed Relay contacts												X	X	X	X	X	X	X	X	X	X						
Boom Speed Relay coil														X	X	X	X										
Drive Enable Relay coil																						X					
Drive Enable Relay contacts																						X					
Steer Right Switch						X																					
Steer Left Switch							X																				
Down Relay contacts																X	X										
Down Relay contacts																								X			
Down Relay contacts																						X					
Boom Extend Drive Interlock Switch																						X					
Forward Proportional Valve																						X					
Reverse Proportional Valve																						X					
Brake Relay coil																						X					
Brake Solenoid Valve																						X					
Brake Relay contacts																						X					
Boom Disconnect Relay coil																						X					
Turret Drive Relay coil																						X					
Drive Control Handle																						X					
High Low Torque Switch																						X					
Torque Relay contacts																						X					
Torque Relay coil																											X
Trim Up Solenoid Valve																X											
Trim Down Solenoid Valve																	X										
Trim Up Relay coil																X											

TROUBLESHOOTING

Section 4.1

Table 4-2: Troubleshooting Guide - Electrical Schematic (Continued)

COMPONENT	FUNCTION	ENGINE RUN - UPPER CONTROLS	ENGINE RUN - LOWER CONTROLS	ENGINE START - UPPER CONTROLS	ENGINE START - LOWER CONTROLS	STEER RIGHT	STEER LEFT	RISER ELEVATE	RISER DESCEND	BOOM EXTEND	BOOM RETRACT	BOOM RAISE	BOOM LOWER	JIB UP	JIB DOWN	CAGE LEVEL UP	CAGE LEVEL DOWN	CAGE ROTATE CCW	CAGE ROTATE CW	SLEW CCW	SLEW CW	DRIVE	FRONT AXLE LOCK	PARKING BRAKE RELEASE	TILT ALARM	TILT LIGHT	TORQUE - HI / LOW
Trim Up Relay contacts																X											
Trim Down Relay coil																	X										
Trim Down Relay contacts																	X										
Jib Up Solenoid Valve														X													
Jib Down Solenoid Valve															X												
Jib Up Relay coil														X													
Jib Up Relay contacts														X													
Jib Down Relay coil															X												
Jib Down Relay contacts															X												
Boom Up Solenoid Valve												X															
Boom Down Solenoid Valve													X														
Boom Up Relay coil												X															
Boom Up Relay contacts												X															
Boom Down Relay coil													X														
Boom Down Relay contacts													X														
Boom Extend Solenoid Valve										X																	
Boom Retract Solenoid Valve											X																
Boom Extend Relay coil										X																	
Boom Extend Relay contacts										X																	
Boom Retract Relay coil											X																
Boom Retract Relay contacts											X																
Riser Up Solenoid Valve								X																			
Riser Down Solenoid Valve									X																		
Riser Up Relay coil								X																			
Riser Up Relay contacts								X																			
Riser Down Relay coil									X																		
Riser Down Relay contacts									X																		
Cage Right Solenoid Valve																			X								
Cage Left Solenoid Valve																		X									
Cage Right Relay coil																			X								
Cage Right Relay contacts																			X								
Cage Left Relay coil																		X									
Cage Left Relay contacts																		X									
Turret Right Solenoid Valve																				X							
Turret Left Solenoid Valve																				X							
Turret Right Relay coil																					X						
Turret Right Relay contacts																					X						
Turret Left Relay coil																				X							

Table 4-2: Troubleshooting Guide - Electrical Schematic (Continued)

COMPONENT	FUNCTION	ENGINE RUN - UPPER CONTROLS	ENGINE RUN - LOWER CONTROLS	ENGINE START - UPPER CONTROLS	ENGINE START - LOWER CONTROLS	STEER RIGHT	STEER LEFT	RISER ELEVATE	RISER DESCEND	BOOM EXTEND	BOOM RETRACT	BOOM RAISE	BOOM LOWER	JIB UP	JIB DOWN	CAGE LEVEL UP	CAGE LEVEL DOWN	CAGE ROTATE CCW	CAGE ROTATE CW	SLEW CCW	SLEW CW	DRIVE	FRONT AXLE LOCK	PARKING BRAKE RELEASE	TILT ALARM	TILT LIGHT	TORQUE - HI / LOW
Turret Left Relay contacts																				X							
Steer Right Solenoid Valve						X																					
Steer Left Solenoid Valve							X																				
Proportional Valve												X	X	X	X	X	X	X	X	X	X						
High Flow Valve								X	X	X	X																
Diode DB21																								X			
Diode DB25																							X	X			
Anti Restart Relay				X	X																						
Hi / Low Torque Switch																										X	
Boom Extend Drive Interlock Switch																						X				X	

4.2 ELECTRONIC FUEL INJECTION SYSTEM OPERATING SPECIFICATIONS

Engine RPM:

Mechanical throttle stop . . .	650 RPM
Low speed	1000 RPM
High speed	3200 RPM

Fuel Pressure:

Gasoline	10 PSI measured with engine running
LPG	Primary 16 PSI measured with lock-off energized, engine off
LPG.	Secondary 12 PSI measured with lock-off energized, engine off

Sensor Resistance:

Air & Coolant. 2106 - 2393 ohms @ 30°F
 465 - 516 ohms @ 70°F
 182 - 199 ohms @ 100°F

Governor Self-learn:

Time	3 1/2 minutes
Coolant Temperature	161°F or above
Procedure	Allow engine to run at 1000 RPM for at least 3 1/2 minutes without any load applied.

Table 4-3: Air and Coolant Sensor Resistance

TEMPERATURE °C	TEMPERATURE °F	NOMINAL RESISTANCE ohms	MINIMUM RESISTANCE ohms	MAXIMUM RESISTANCE ohms
-40	-40	93630	85570	101400
-30	-22	49320	45250	53310
-20	-4	27050	24910	29160
-10	14	15420	14250	16580
0	32	9099	8442	9767
10	50	5546	5165	5939
20	68	3481	3254	3719
25	77	2787	2609	2974
30	86	2245	2106	2393
40	104	1484	1398	1579
50	122	1004	949	1065
60	140	693	657	734
70	158	488	465	516
80	176	349	334	369
90	194	255	244	268
100	212	189	182	199
110	230	144	139	151
120	248	109	105	114
130	266	84	80	88

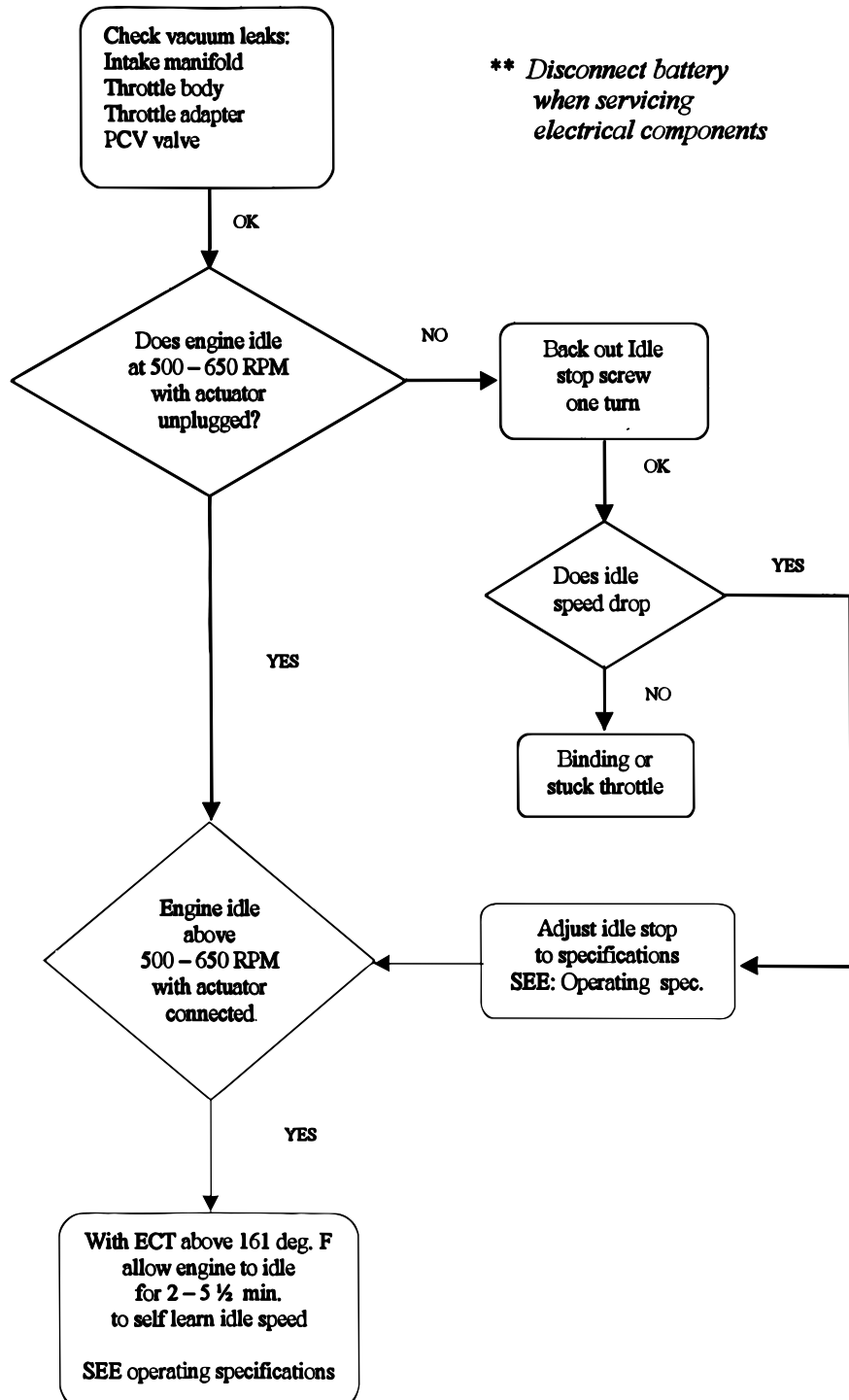
4.3 DIAGNOSTIC PROCEDURES

Diagnostic procedures are listed separately for each fuel but, unlike mechanical fuel systems that require different thinking processes for gasoline and LPG, the diagnosis procedures for both the gasoline and LPG ZEEMS system follow the same thinking pattern.

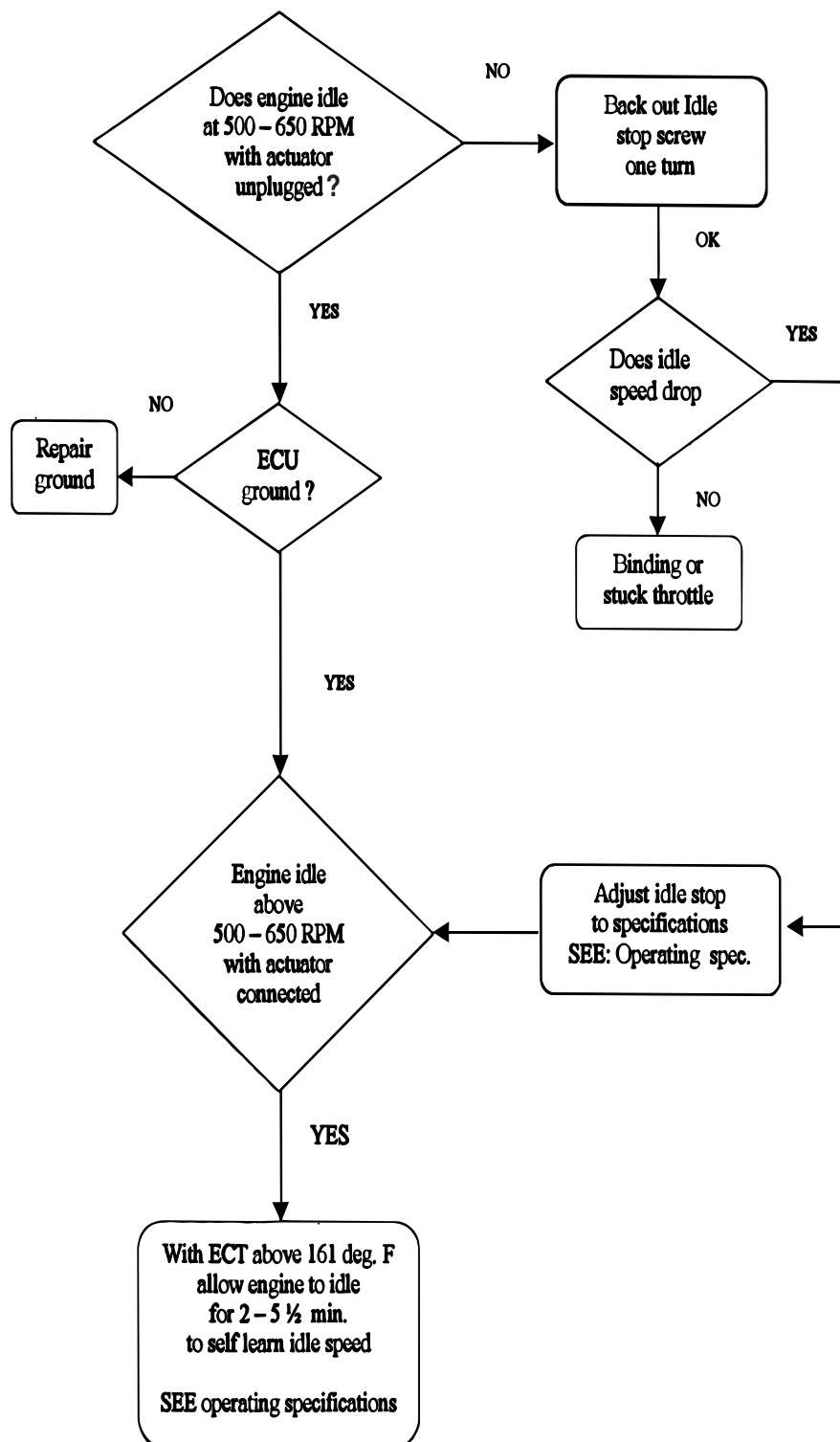
The following is a quick check list of items to check.

- Governor idle self learn
- Ignition timing
- Fuel pressures
- Fuel level
- Sensors and Connectors
- Alternator charging voltages
- Battery condition

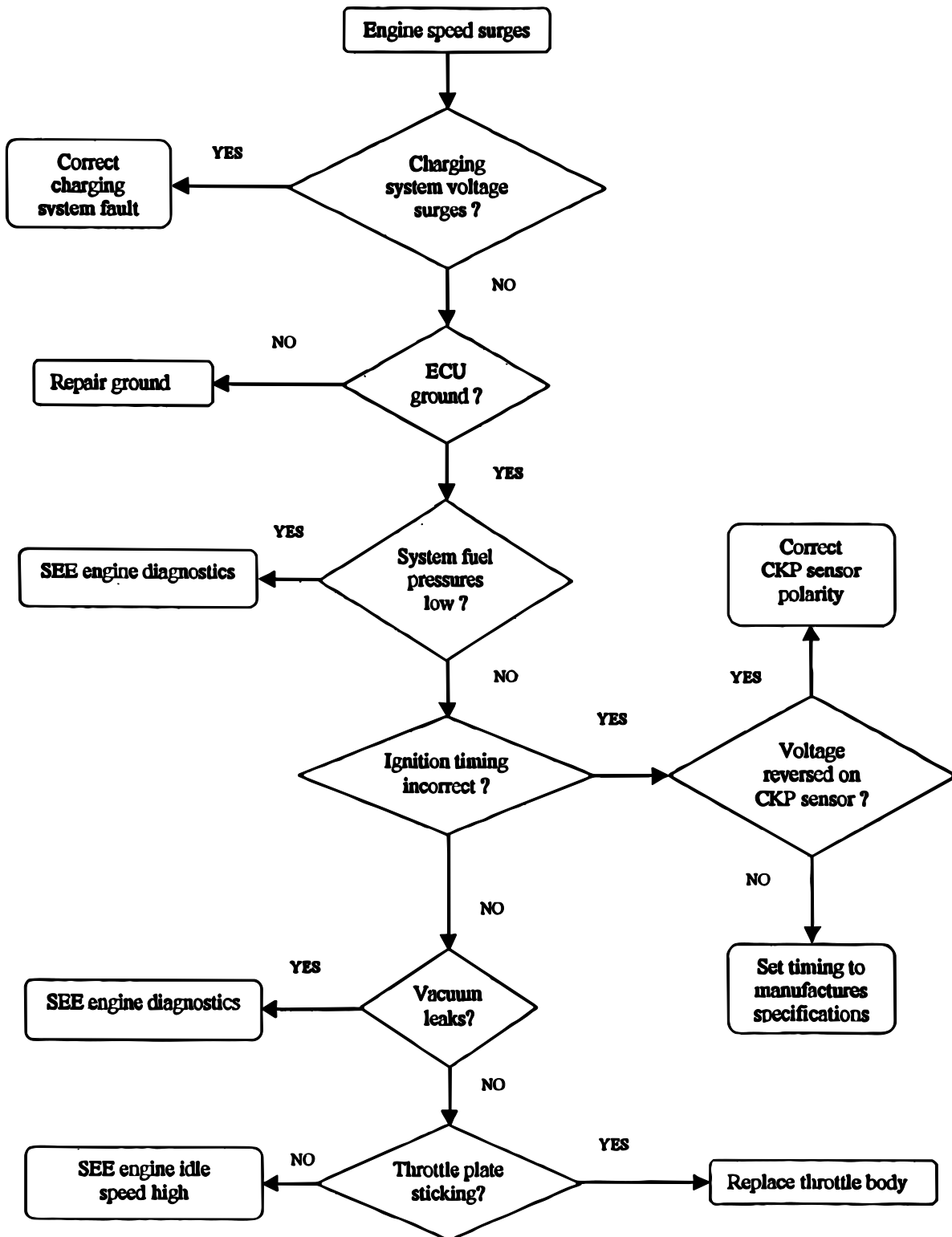
Engine idle speed high

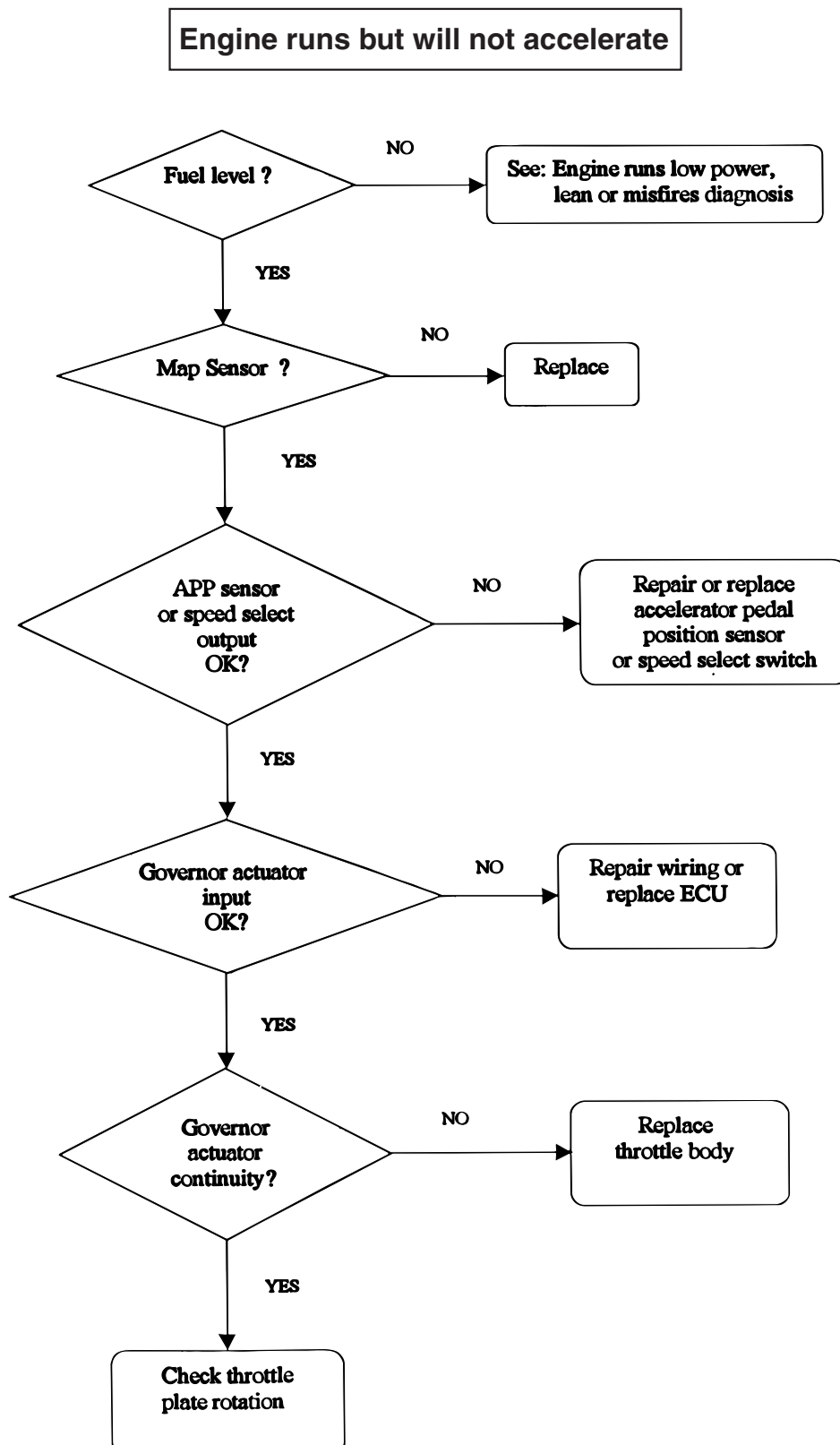


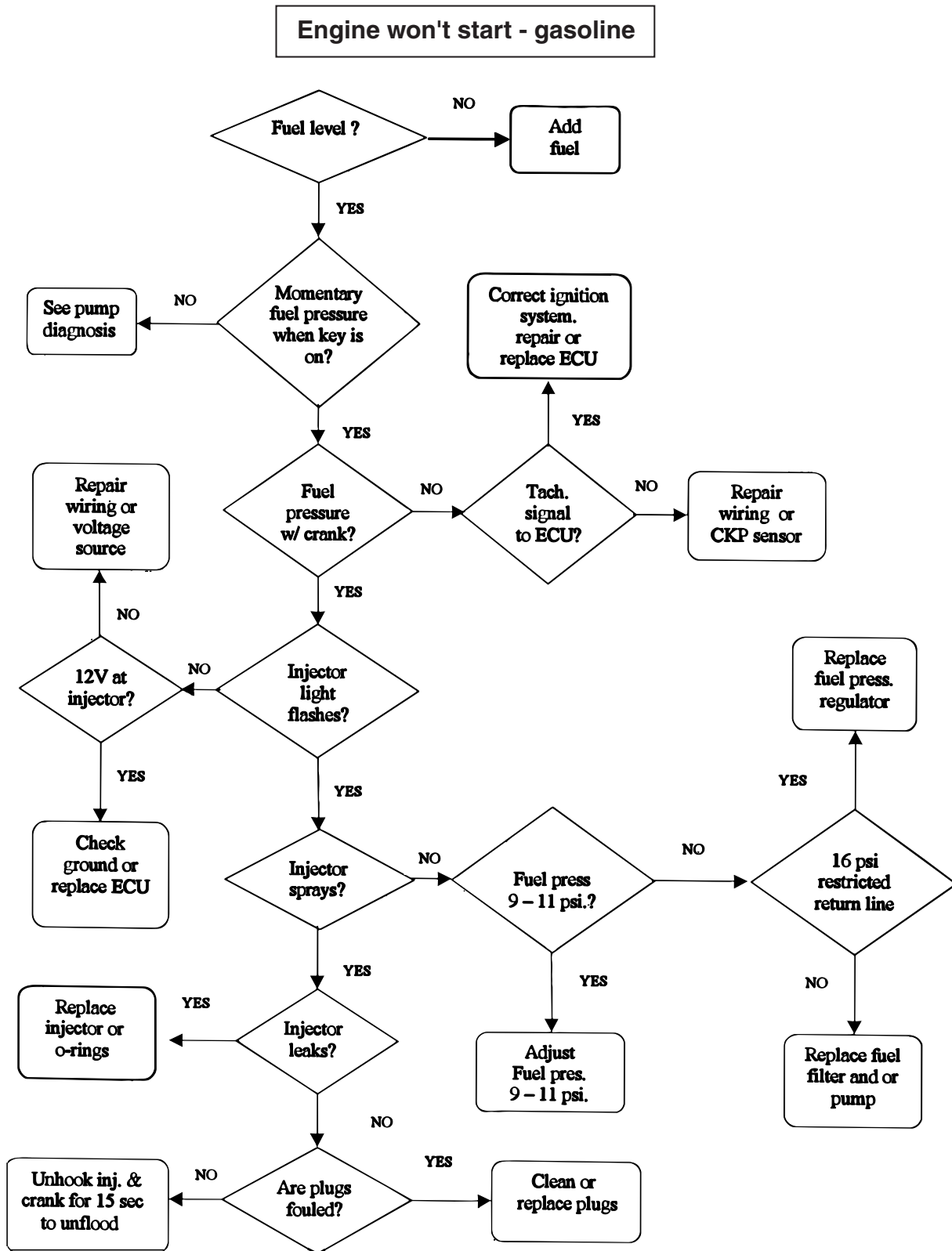
Engine speed "spikes" at idle



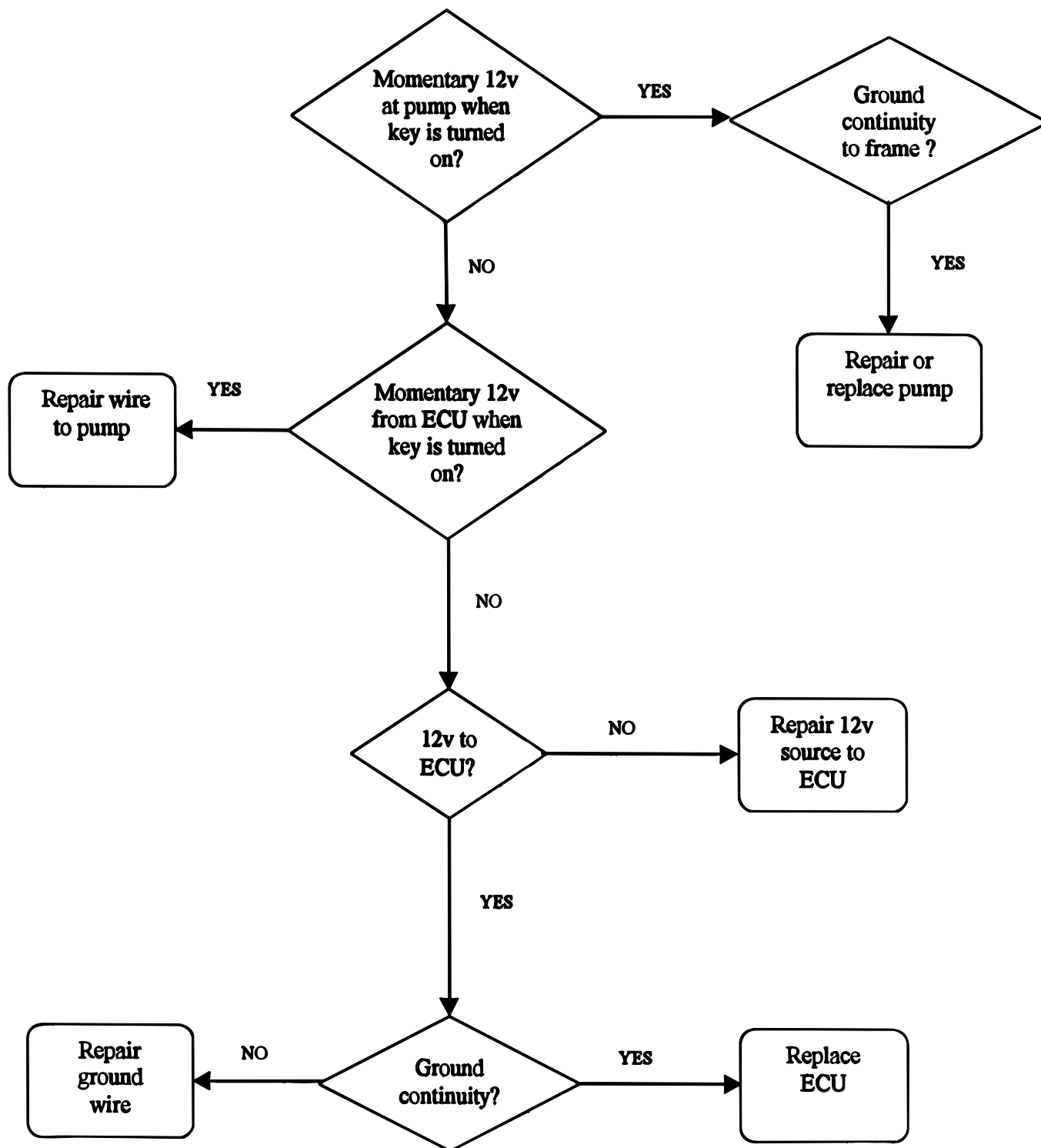
Engine runs erratically; poor governor performance

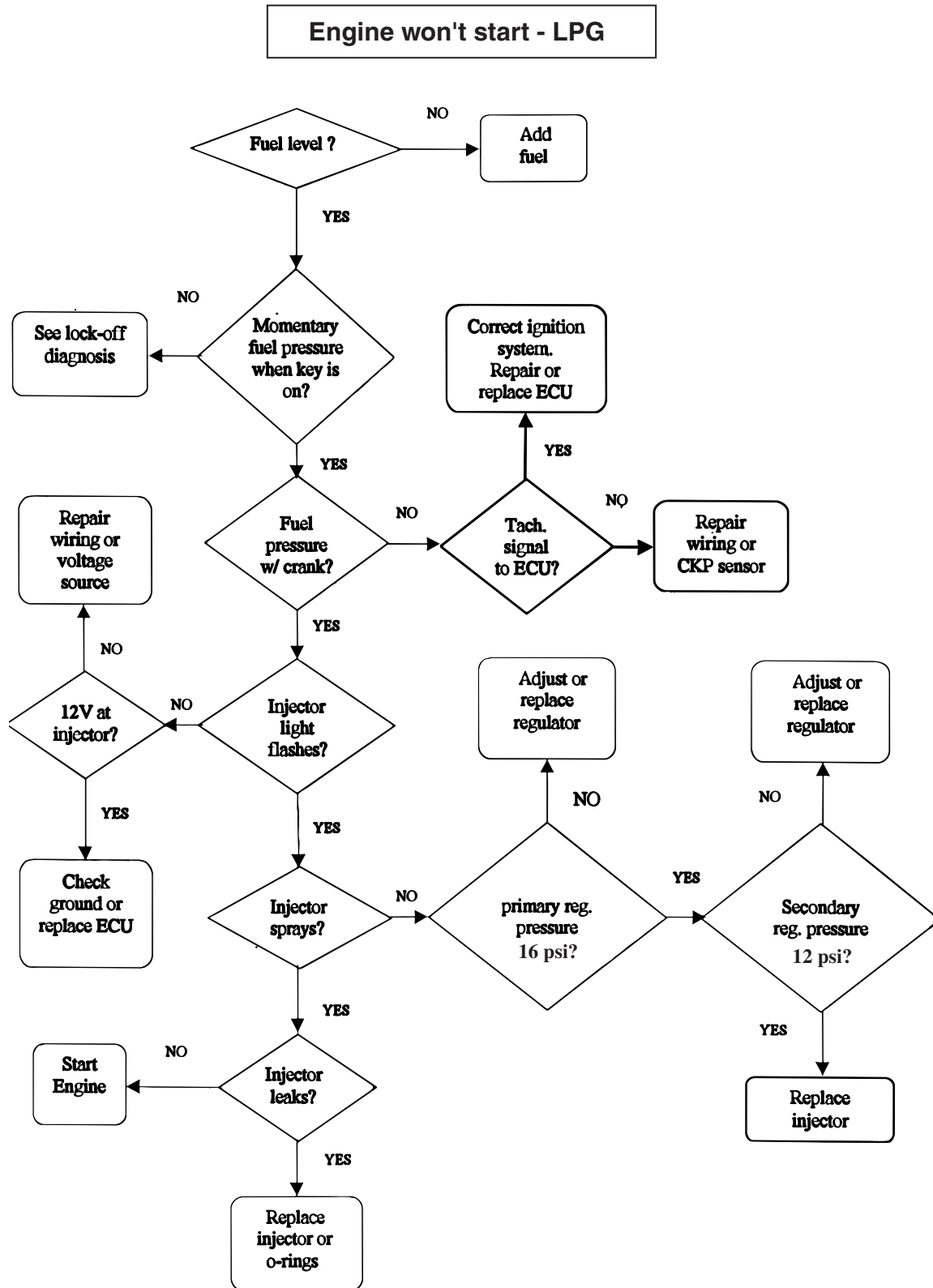


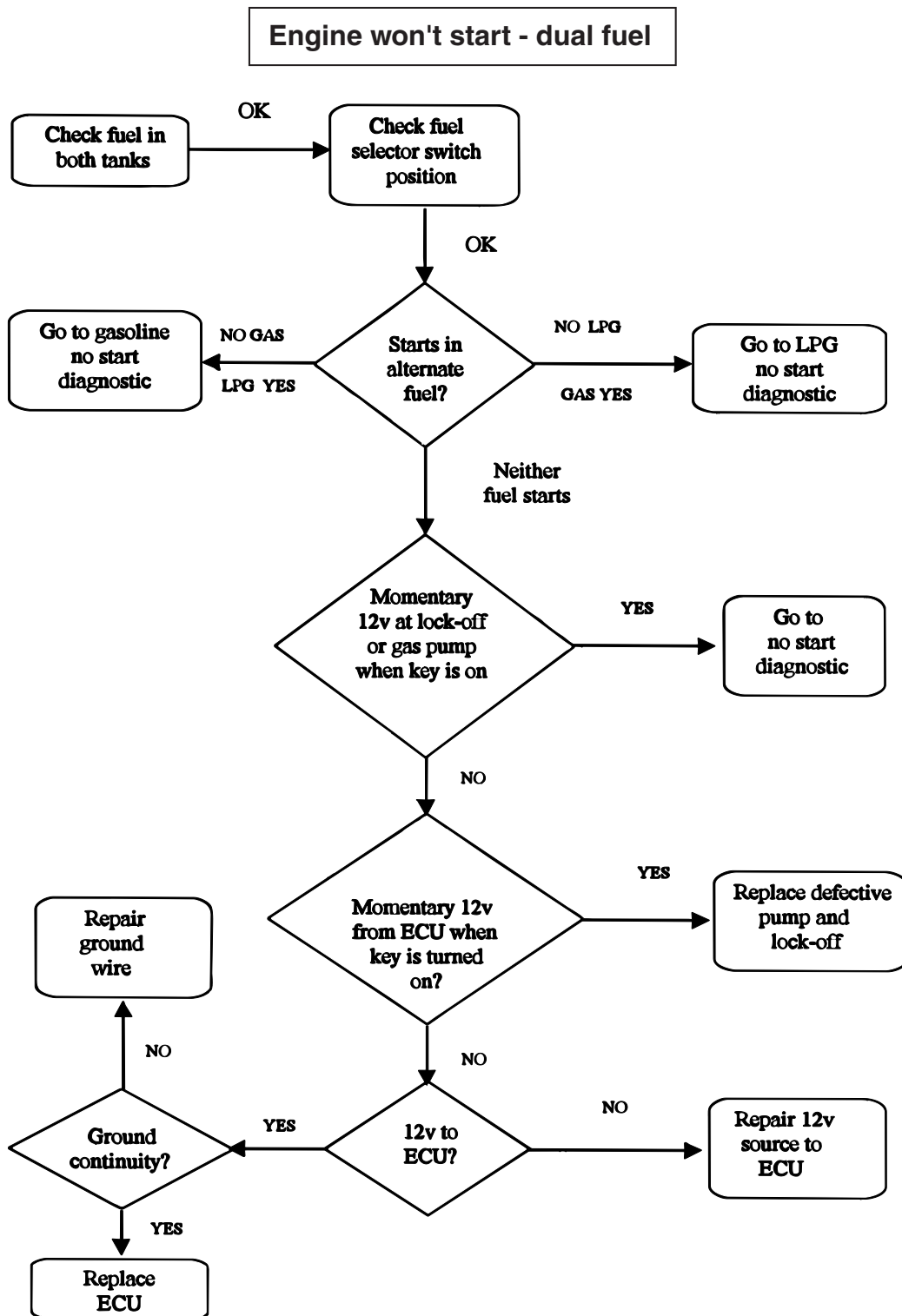




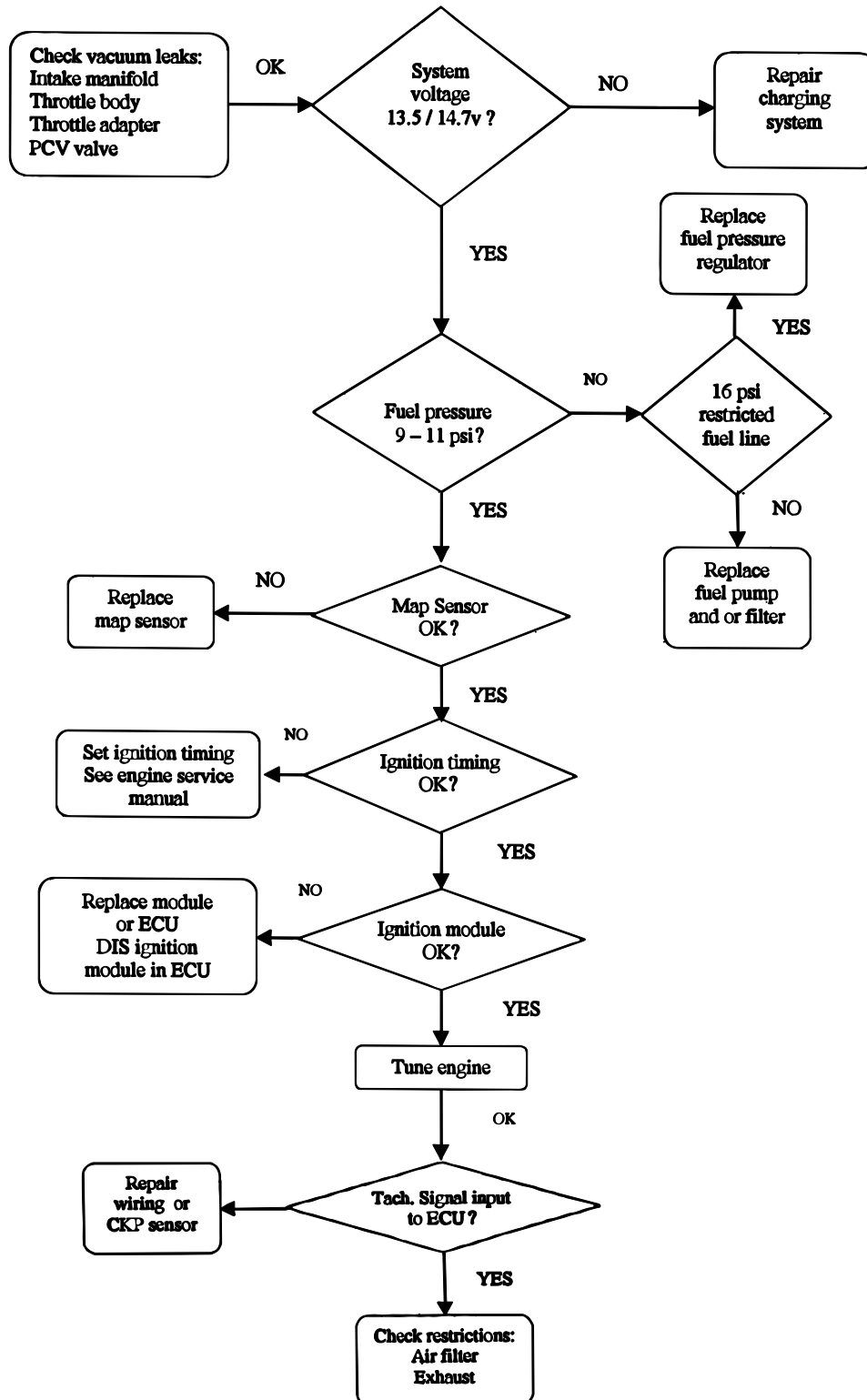
Gasoline fuel pump diagnosis



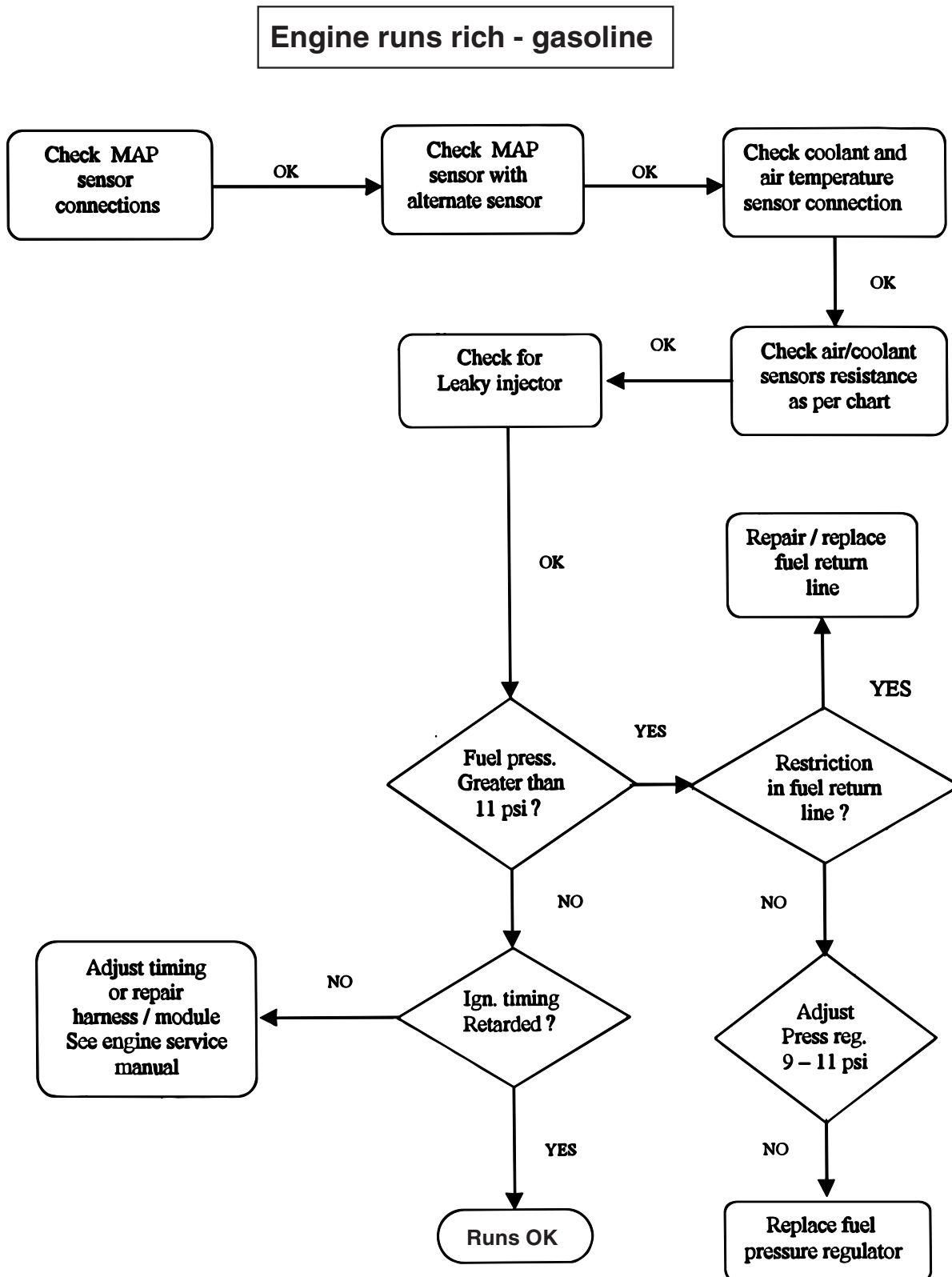




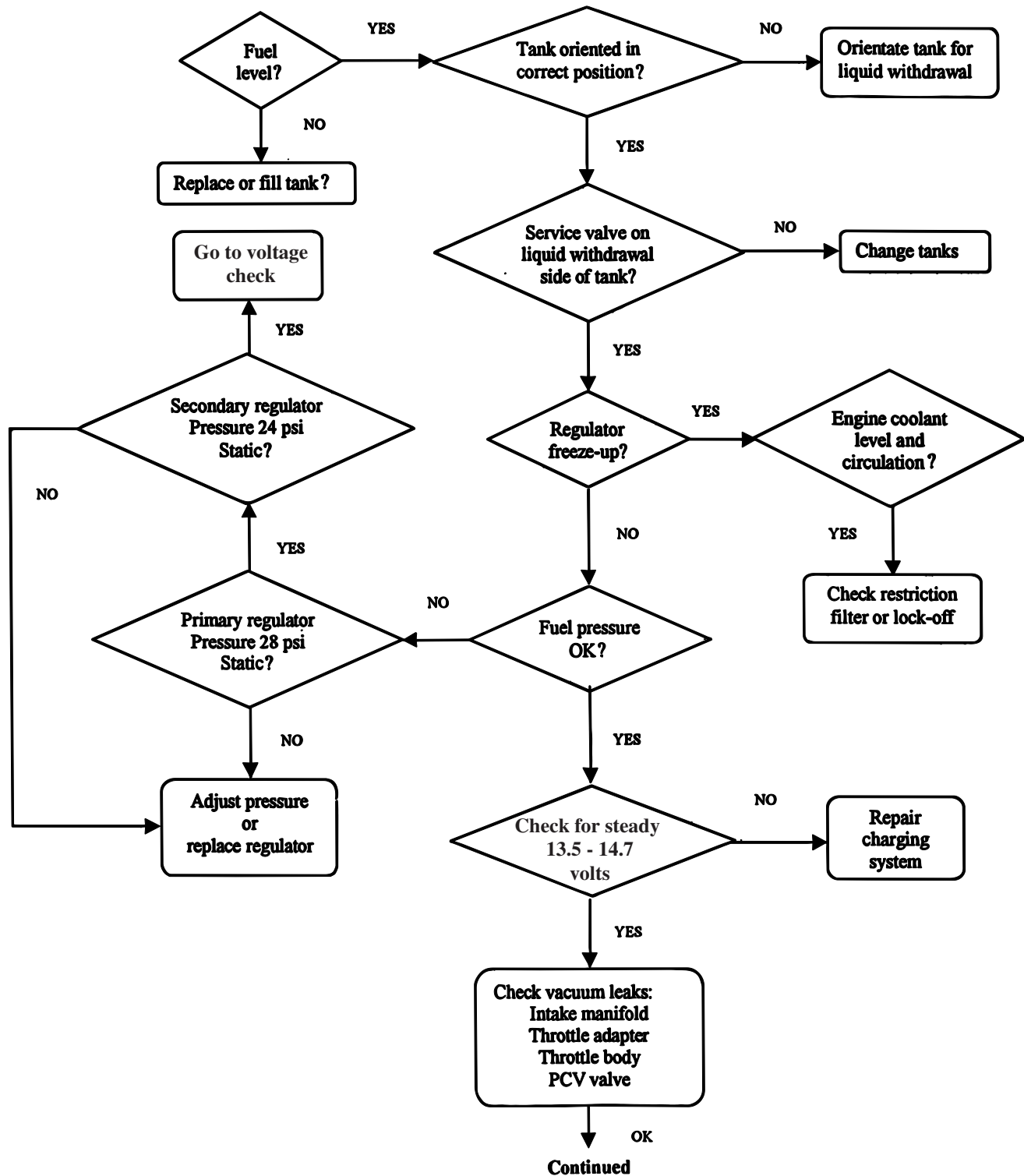
Engine runs low power, lean or misfires - gasoline



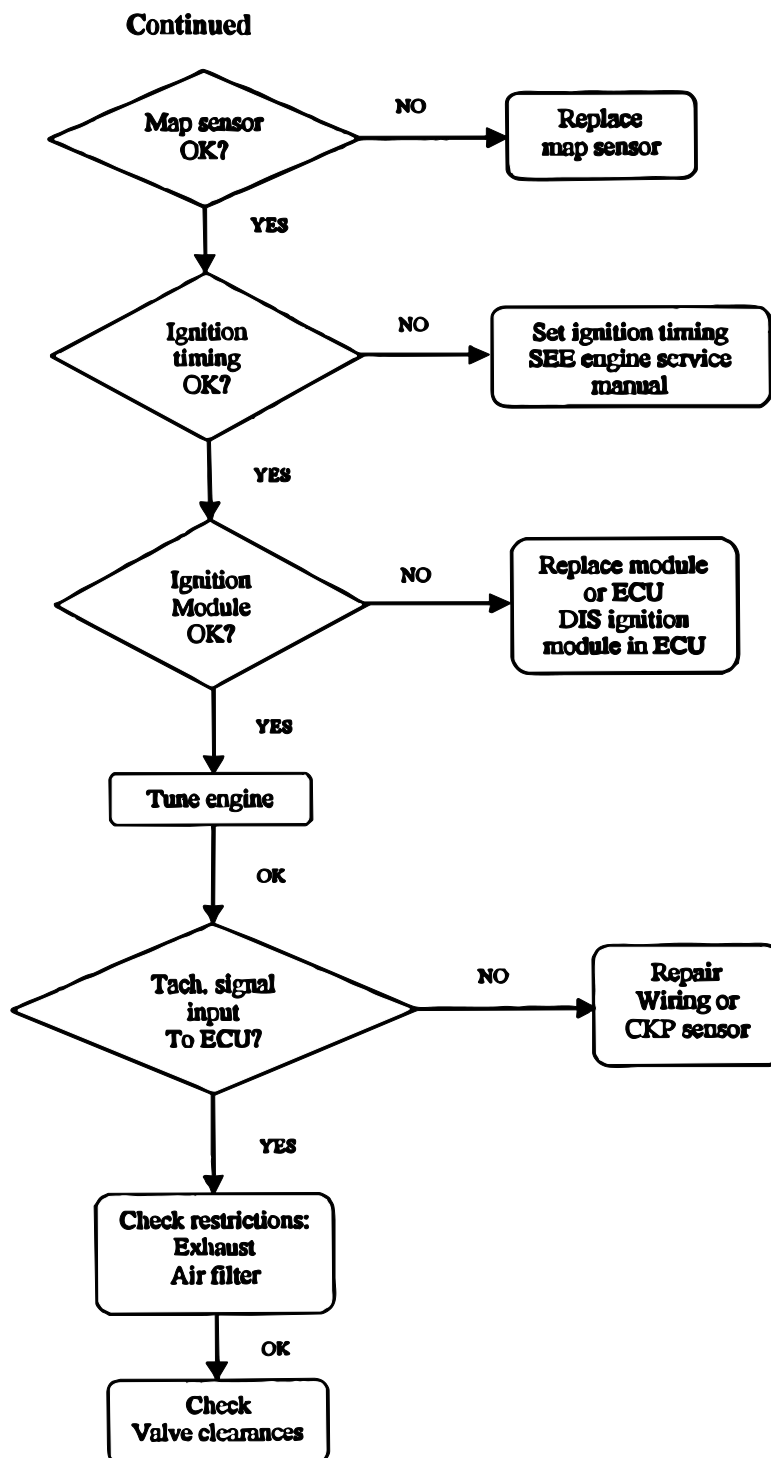
Engine runs rich - gasoline



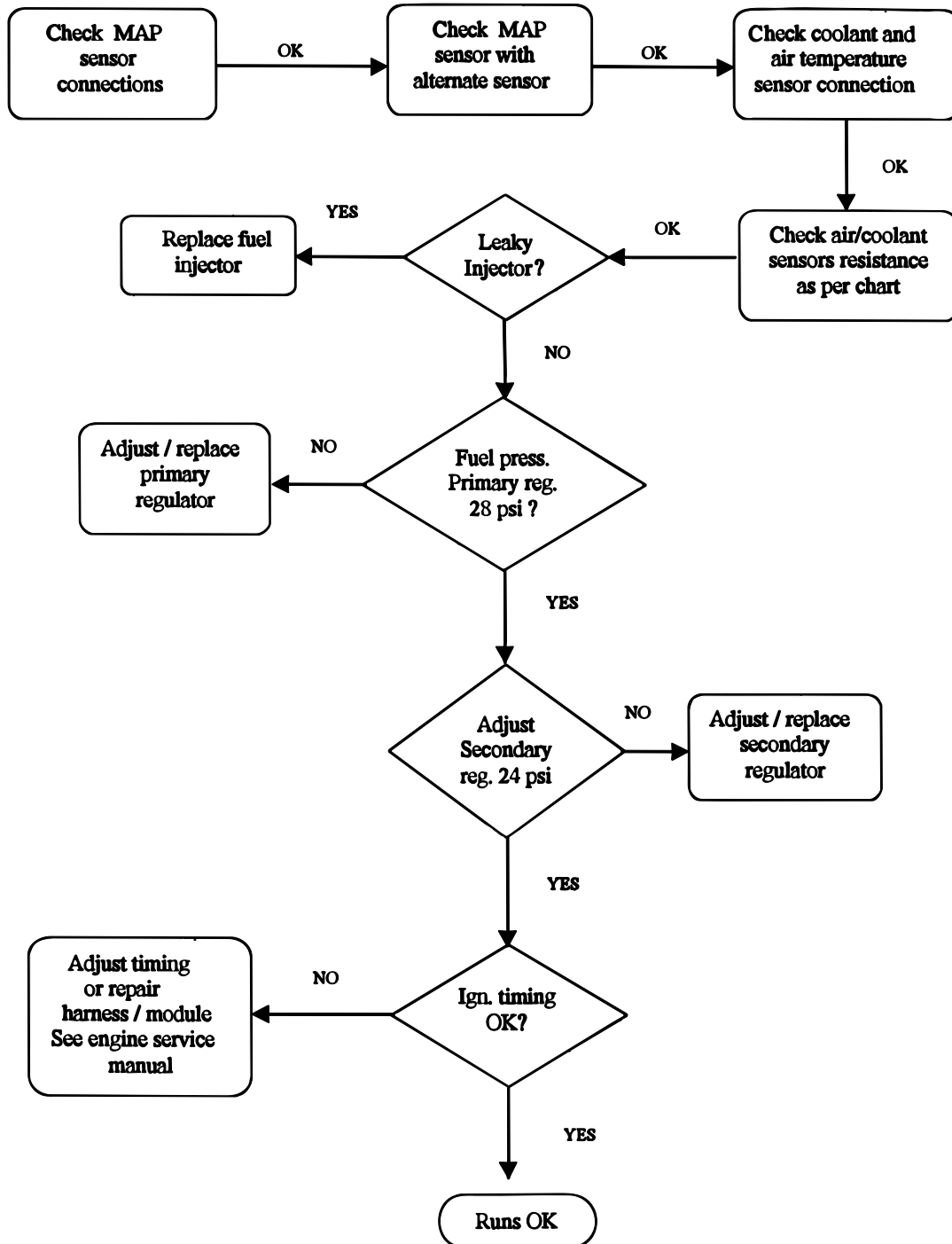
Engine runs low power, lean or misfires - LPG (1 of 2)



Engine runs low power, lean or misfires - LPG (2 of 2)



Engine runs rich - LPG



NOTES:

Section 5

SCHEMATICS

Introduction

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 *Section 4*. They allow understanding of the makeup and functions of the systems for checking, tracing, and faultfinding 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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5.1 ELECTRICAL SCHEMATIC - DUAL FUEL

Table 5-1: Legend, Electrical Schematic Legend, Dual Fuel 068341-032

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM 1	Horn	Warning sound	Front of Chassis
ALM 2	Tilt Alarm	Provides warning sound and light when machine is off level	Upper Control Box
BAT	Batteries	Power to start Engine	Chassis
CB1	Circuit Breaker 10 AMP	Chassis Control power	Chassis Control Box
CB2	Circuit Breaker 10 AMP	Chassis Controls Relay signal and Engine Relay signal	Chassis Control Box
CB3	Circuit Breaker 10 AMP	Many Controls through Engine Relay	Upper Control Box
CB4	Circuit Breaker 10 AMP	Power to Ignition Switch	Upper Control Box
CONT1	Controller	Controls operating speed of low flow functions	Upper Control Box
ECU	Engine Control Unit	Controls Ignition and Fuel management	Engine Compartment
FU1	Fuse 25 AMP	Main Fuse	Chassis Control Box
INJ1	Propane Injector	Injects propane into Throttle Body	Engine Compartment
INJ2	Gas Injector	Injects gas into Throttle Body	Engine Compartment
L1	Tilt Light	Lights when machine is in tilt condition	Upper Control Box
MOT1	Fuel Pump Motor	Supplies fuel to Throttle Body	Engine Compartment
MTR1	Hour Meter	Display run time	Chassis Control Box
PMP1	Drive Pump	Hydraulic drive power	Engine Compartment
R1 Lower	Relay	Power to up Trim Solenoid	Relay Panel
R1 Upper	Boom Disconnect Relay	Disables Boom functions when Drive is operated	Upper Control Box
R2 Lower	Relay	Power to Down Trim Solenoid	Chassis Control Box
R2 Upper	Turret Drive Relay	Allows Turret operation while Drive is activated	Upper Control Box
R3 Lower	Relay	Power to Up Jib Solenoid	Chassis Control Box
R3 Upper	Boom Elevate Speed Relay	Power to 'R' Terminal for Boom Up/Down operation	Upper Control Box
R4 Lower	Relay	Power to Down Jib Solenoid	Chassis Control Box
R4 Upper	Drive Enable Relay	Disables drive when Boom functions operated	Upper Control Box
R5	Up Boom Relay	Power to Up Boom Solenoid	Chassis Control Box
R6	Down Boom Relay	Power to Down Boom Solenoid	Chassis Control Box
R7	Extend Boom Relay	Power to Extend Boom Solenoid	Chassis Control Box
R8	Retract Boom Relay	Power to Retract Boom Solenoid	Chassis Control Box
R9	Up Riser Relay	Power to Up Riser Solenoid	Chassis Control Box
R10	Down Riser Relay	Power to Down Riser Solenoid	Chassis Control Box
R11	Cage Right Relay	Power to Cage Right Solenoid	Chassis Control Box
R12	Cage Left Relay	Power to Cage Left Solenoid	Chassis Control Box
R13	Turret Right Relay	Power to Turret Right Solenoid	Chassis Control Box
R14	Turret Left Relay	Power to Turret Left Solenoid	Chassis Control Box
R15	Engine Relay	Enables Engine to operate	Chassis Control Box
R16	Brake Relay	Power to Brake Solenoid	Chassis Control Box
R17	Engine Throttle Relay	Power to Engine Throttle Control	Chassis Control Box
R18	Left Lock Relay	Power to Left Axle Lock Solenoid	Chassis Control Box
R19	Right Lock Relay	Power to Right Axle Lock Solenoid	Chassis Control Box
R20	Horn Relay	Power to Horn	Chassis Control Box
R21	Low Tilt Relay	Disables drive functions and sounds Alarm	Chassis Control Box
R22	Down Relay	Actuated by Limit Switches	Chassis Control Box
R23	Power Relay	Diverts power to Upper/Lower	Chassis Control Box
R24	Torque Relay	High Torque/High Speed	Chassis Control Box

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
R25	Anti-Restart Relay	Eliminates accidental restart	Chassis Control Box
R26	Fuel Select Relay	Selects Propane or Gas	Engine Compartment
R27	Relay	Propane Relay	Chassis Control Box
R28	Level Drive Interlock Relay	Disables drive and steer functions when machine is off level	Upper Control Box
R29	Engine Power Relay	Supplies power to all Engine components	Engine Compartment
R30	Motor Start Relay	Engages motor start relay	Engine Compartment
RES1	Rheostat	Drive speed control	Drive Control Handle
RPM	RPM Magnetic Pickup	Provides RPM signal to Engine Control Unit	Engine Compartment
S1	Trim Switch (two)	Power to Trim Solenoid	Chassis Control Box, Upper Control Box
S2	Jib Switch (two)	Power to Jib Solenoid	Chassis Control Box, Upper Control Box
S3	Boom Elevate Switch (two)	Power to Boom Lift Solenoid	Chassis Control Box, Upper Control Box
S4	Boom Extend Switch (two)	Power to Boom Extend Solenoid	Chassis Control Box, Upper Control Box
S5	Riser Switch (two)	Power to Riser Solenoid	Chassis Control Box, Upper Control Box
S6	Cage Switch (two)	Power to Cage Rotate Solenoid	Chassis Control Box, Upper Control Box
S7	Turret Switch (two)	Power to Turret Rotate Solenoid	Chassis Control Box, Upper Control Box
S8	High Torque Switch	High Torque/High Speed	Control Handle
S9	Platform Emergency Stop Switch	Emergency Stop	Upper Control Box
S10	Steer Switch	Power to Left Steer and Right Steer Relays	Upper Control Box, top of Control Handle
S11	Oil Pressure Switch	Stops Engine if low pressure	Engine
S12	Engine Start Switch	Starts Engine	Chassis Control Box
S13	Platform/Chassis Switch	Supplies power to Platform/Chassis	Chassis Control Box
S14	Down Limit Switch	Inhibits cage level, actuates creep speed	Turret at Boom attachment
S15	Chassis Emergency Stop Switch	Emergency Stop	Chassis Control Box
S16	Foot Switch	Enables operation from platform	Floor of platform
S17	Hi/Lo Switch	Selects High Speed or High Torque	Platform Control Box
S18	Platform Key Switch	Enables operation from platform	Platform Control Box
S19	Horn Switch	Sounds Horn	Platform Control Box
S20	Boom Extend Limit Switch	Inhibits cage level, actuates creep speed	On rear of Boom
S21	Gas/Propane Select Switch	Gas/Propane Select	Platform Control Box
SNSR1	Level Sensor	Provides power to Tilt Relay when level	Engine Compartment
SNSR2	Air Temp	Provides air temperature to Engine Control Unit	Engine Compartment
SNSR3	Coolant Temp	Provides water temperature to Engine Control Unit	Engine Compartment
SNSR4	Map Sensor	Senses Intake Manifold absolute pressure	Engine Compartment
SOL1	Trim UP Solenoid	Controls Cage Level Up Valve	Right side of Manifold
SOL2	Trim Down Solenoid	Controls Cage Level Down Valve	Right side of Manifold
SOL3	Jib Up Solenoid	Controls Jib Lift Valve	Right side of Manifold
SOL4	Jib Down Solenoid	Controls Jib Down Valve	Right side of Manifold
SOL5	Boom Up Solenoid	Controls Boom Lift Valve	Right side of Manifold

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
SOL6	Boom Down Solenoid	Controls Boom Down Valve	Right side of Manifold
SOL7	Boom Extend Solenoid	Controls Boom Extend Valve	Right side of Manifold
SOL8	Boom Retract Solenoid	Controls Boom Retract Valve	Right side of Manifold
SOL9	Riser Up Solenoid	Controls Riser Lift Valve	Right side of Manifold
SOL10	Riser Down Solenoid	Controls Riser Down Valve	Right side of Manifold
SOL11	Cage Right Solenoid	Controls Cage rotate right	Right side of Manifold
SOL12	Cage Left Solenoid	Controls Cage rotate left	Right side of Manifold
SOL13	Turret Right Solenoid	Controls Turret rotate right	Right side of Manifold
SOL14	Turret Left Solenoid	Controls Turret rotate left	Right side of Manifold
SOL15	Steer Right Solenoid	Controls Steer Valve when steering right	Right side of Manifold
SOL16	Steer Left Solenoid	Controls Steer Valve when steering left	Right side of Manifold
SOL17	Low Flow	Proportionally controls Low Flow Valve	Right side of Manifold
SOL18	High Flow Dump	Controls High Flow Valve	Right side of Manifold
SOL19	LP Lock-off Solenoid	Allows propane to Throttle Body	Engine Compartment
SOL20	Fuel Pump Solenoid	Supplies power to fuel pump	Engine Compartment
SOL20	Brake Solenoid	Releases Brakes	Drive Valve Block
SOL21	High Torque Solenoid	Allows High Torque	Drive Valve Block
SOL22	Axle Lock Solenoid	Locks Axle Cylinder	Drive Valve Block

Section 5.1



5.2 ELECTRICAL SCHEMATIC, DIESEL - JOHN DEERE ENGINE

Table 5-2: Electrical Schematic Legend, Diesel 068341-030

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM 1	Horn	Warning sound	Front of Chassis
ALM 2	Tilt Alarm	Provides warning sound and light when machine is off level	Upper Control Box
BAT	Batteries	Power to start Engine	Chassis
CB1	Circuit Breaker 10 AMP	Chassis Control power	Chassis Control Box
CB2	Circuit Breaker 10 AMP	Chassis Controls Relay signal and Engine Relay signal	Chassis Control Box
CB3	Circuit Breaker 10 AMP	Many Controls through Engine Relay	Upper Control Box
CB4	Circuit Breaker 10 AMP	Power to Ignition Switch	Upper Control Box
CONT1	Controller	Controls operating speed of low flow functions	Upper Control Box
FU1	Fuse 25 AMP	Main Fuse	Chassis Control Box
L1	Tilt Light	Lights when machine is in tilt condition	Upper Control Box
MTR1	Hour Meter	Display run time	Chassis Control Box
PMP1	Drive Pump	Hydraulic drive power	Engine Compartment
R1 Lower	Relay	Power to up Trim Solenoid	Relay Panel
R1 Upper	Boom Disconnect Relay	Disables Boom functions when Drive is operated	Upper Control Box
R2 Lower	Relay	Power to Down Trim Solenoid	Chassis Control Box
R2 Upper	Turret Drive Relay	Allows Turret operation while Drive is activated	Upper Control Box
R3 Lower	Relay	Power to Up Jib Solenoid	Chassis Control Box
R3 Upper	Boom Elevate Speed Relay	Power to 'R' Terminal for Boom Up/Down operation	Upper Control Box
R4 Lower	Relay	Power to Down Jib Solenoid	Chassis Control Box
R4 Upper	Drive Enable Relay	Disables drive when Boom functions operated	Upper Control Box
R5	Up Boom Relay	Power to Up Boom Solenoid	Chassis Control Box
R6	Down Boom Relay	Power to Down Boom Solenoid	Chassis Control Box
R7	Extend Boom Relay	Power to Extend Boom Solenoid	Chassis Control Box
R8	Retract Boom Relay	Power to Retract Boom Solenoid	Chassis Control Box
R9	Up Riser Relay	Power to Up Riser Solenoid	Chassis Control Box
R10	Down Riser Relay	Power to Down Riser Solenoid	Chassis Control Box
R11	Cage Right Relay	Power to Cage Right Solenoid	Chassis Control Box
R12	Cage Left Relay	Power to Cage Left Solenoid	Chassis Control Box
R13	Turret Right Relay	Power to Turret Right Solenoid	Chassis Control Box
R14	Turret Left Relay	Power to Turret Left Solenoid	Chassis Control Box
R15	Engine Relay	Enables Engine to operate	Chassis Control Box
R16	Brake Relay	Power to Brake Solenoid	Chassis Control Box
R17	Engine Throttle Relay	Power to Engine Throttle Control	Chassis Control Box
R18	Left Lock Relay	Power to Left Axle Lock Solenoid	Chassis Control Box
R19	Right Lock Relay	Power to Right Axle Lock Solenoid	Chassis Control Box
R20	Horn Relay	Power to Horn	Chassis Control Box
R21	Low Tilt Relay	Disables drive functions and sounds Alarm	Chassis Control Box
R22	Down Relay	Actuated by Limit Switches	Chassis Control Box
R23	Power Relay	Diverts power to Upper/Lower	Chassis Control Box
R24	Torque Relay	High Torque/High Speed	Chassis Control Box
R25	Anti-Restart Relay	Eliminates accidental restart	Chassis Control Box
R26	Pre-Heat Relay	Power to glow plugs	Engine Compartment
RES1	Rheostat	Drive speed control	Drive Control Handle
S1	Trim Switch (two)	Power to Trim Solenoid	Chassis Control Box, Upper Control Box

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
S2	Jib Switch (two)	Power to Jib Solenoid	Chassis Control Box, Upper Control Box
S3	Boom Elevate Switch (two)	Power to Boom Lift Solenoid	Chassis Control Box, Upper Control Box
S4	Boom Extend Switch (two)	Power to Boom Extend Solenoid	Chassis Control Box, Upper Control Box
S5	Riser Switch (two)	Power to Riser Solenoid	Chassis Control Box, Upper Control Box
S6	Cage Switch (two)	Power to Cage Rotate Solenoid	Chassis Control Box, Upper Control Box
S7	Turret Switch (two)	Power to Turret Rotate Solenoid	Chassis Control Box, Upper Control Box
S8	High Torque Switch	High Torque/High Speed	Control Handle
S9	Platform Emergency Stop Switch	Emergency Stop	Upper Control Box
S10	Steer Switch	Power to Left Steer and Right Steer Relays	Upper Control Box, top of Control Handle
S11	Oil Pressure Switch	Stops Engine if low pressure	Engine
S12	Engine Start Switch	Starts Engine	Chassis Control Box
S13	Platform/Chassis Switch	Supplies power to Platform/Chassis	Chassis Control Box
S14	Down Limit Switch	Inhibits cage level, actuates creep speed	Turret at Boom attachment
S15	Chassis Emergency Stop Switch	Emergency Stop	Chassis Control Box
S16	Foot Switch	Enables operation from platform	Floor of platform
S17	Hi/Lo Switch	Selects High Speed or High Torque	Platform Control Box
S18	Platform Key Switch	Enables operation from platform	Platform Control Box
S19	Horn Switch	Sounds Horn	Platform Control Box
S20	Boom Extend Limit Switch	Inhibits cage level, actuates creep speed	On rear of Boom
S21	Intake Air Preheat Switch (two)	Actuate glow plugs for cold start	Chassis Control Box, Upper Control Box
SNSR1	Level Sensor	Provides power to Tilt Relay when level	Engine Compartment
SOL1	Trim UP Solenoid	Controls Cage Level Up Valve	Right side of Manifold
SOL2	Trim Down Solenoid	Controls Cage Level Down Valve	Right side of Manifold
SOL3	Jib Up Solenoid	Controls Jib Lift Valve	Right side of Manifold
SOL4	Jib Down Solenoid	Controls Jib Down Valve	Right side of Manifold
SOL5	Boom Up Solenoid	Controls Boom Lift Valve	Right side of Manifold
SOL6	Boom Down Solenoid	Controls Boom Down Valve	Right side of Manifold
SOL7	Boom Extend Solenoid	Controls Boom Extend Valve	Right side of Manifold
SOL8	Boom Retract Solenoid	Controls Boom Retract Valve	Right side of Manifold
SOL9	Riser Up Solenoid	Controls Riser Lift Valve	Right side of Manifold
SOL10	Riser Down Solenoid	Controls Riser Down Valve	Right side of Manifold
SOL11	Cage Right Solenoid	Controls Cage rotate right	Right side of Manifold
SOL12	Cage Left Solenoid	Controls Cage rotate left	Right side of Manifold
SOL13	Turret Right Solenoid	Controls Turret rotate right	Right side of Manifold
SOL14	Turret Left Solenoid	Controls Turret rotate left	Right side of Manifold
SOL15	Steer Right Solenoid	Controls Steer Valve when steering right	Right side of Manifold
SOL16	Steer Left Solenoid	Controls Steer Valve when steering left	Right side of Manifold
SOL17	Low Flow	Proportionally controls Low Flow Valve	Right side of Manifold
SOL18	High Flow Dump	Controls High Flow Valve	Right side of Manifold
SOL20	LP Lock-off Solenoid	Allows propane to Throttle Body	Engine Compartment

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
SOL21	Brake Solenoid	Releases Brakes	Drive Valve Block
SOL22	High Torque Solenoid	Allows High Torque	Drive Valve Block
SOL23	Axle Lock Solenoid	Locks Axle Cylinder	Drive Valve Block
SOL24	Engine Speed Solenoid	Throttle control solenoid	Engine Compartment

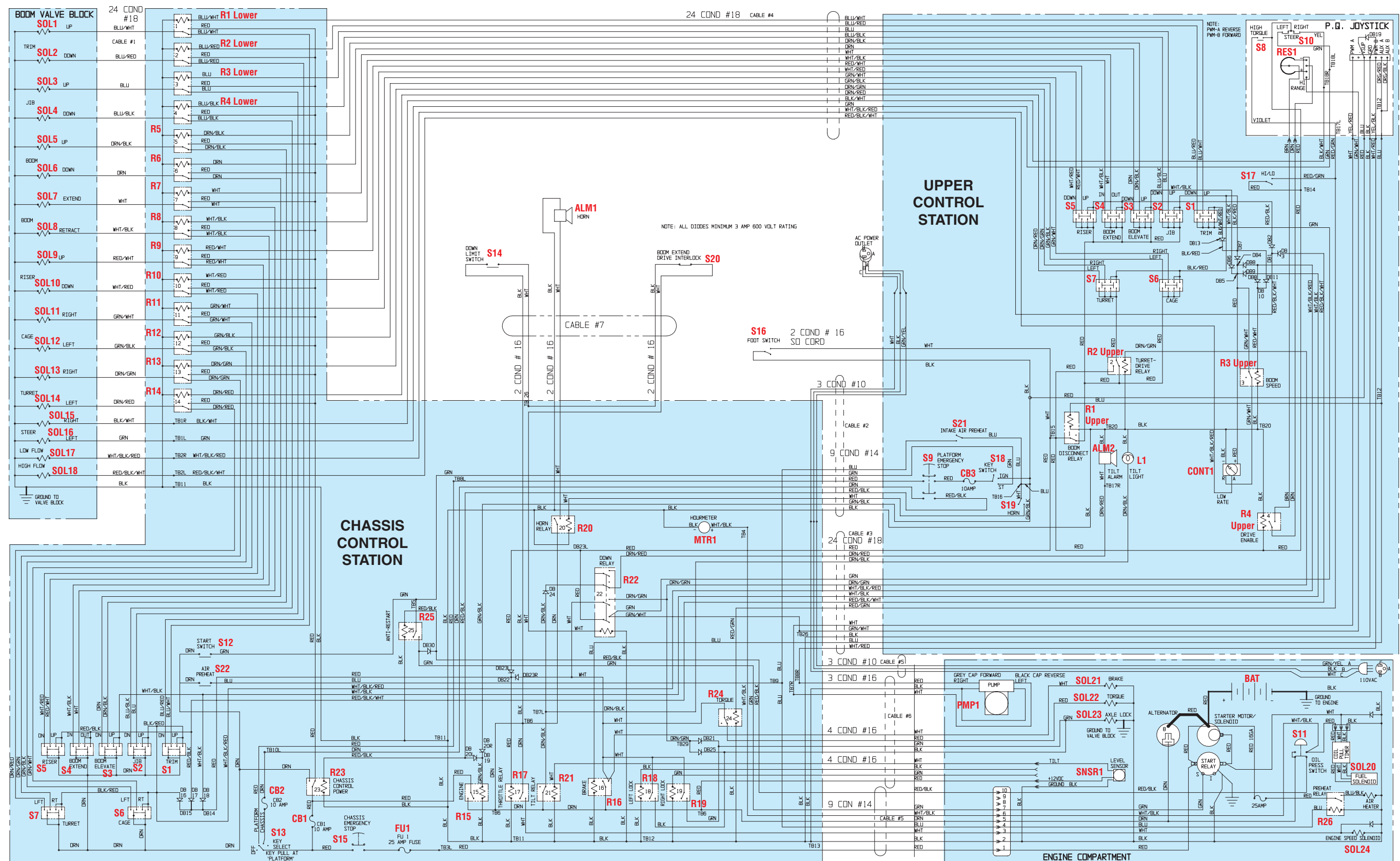


Figure 5-2: Electrical Schematic, John Deere Diesel 068341-030

5.3 ELECTRICAL SCHEMATIC, DIESEL - KUBOTA

Table 5-3: Electrical Schematic Legend, Diesel 068341-033

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM 1	Horn	Warning sound	Front of Chassis
ALM 2	Tilt Alarm	Provides warning sound and light when machine is off level	Upper Control Box
BAT	Batteries	Power to start Engine	Chassis
CB1	Circuit Breaker 10 AMP	Chassis Control power	Chassis Control Box
CB2	Circuit Breaker 10 AMP	Chassis Controls Relay signal and Engine Relay signal	Chassis Control Box
CB3	Circuit Breaker 10 AMP	Many Controls through Engine Relay	Upper Control Box
CB4	Circuit Breaker 10 AMP	Power to Ignition Switch	Upper Control Box
CONT1	Controller	Controls operating speed of low flow functions	Upper Control Box
FU1	Fuse 25 AMP	Main Fuse	Chassis Control Box
L1	Tilt Light	Lights when machine is in tilt condition	Upper Control Box
MTR1	Hour Meter	Display run time	Chassis Control Box
PMP1	Drive Pump	Hydraulic drive power	Engine Compartment
R1 Lower	Relay	Power to up Trim Solenoid	Relay Panel
R1 Upper	Boom Disconnect Relay	Disables Boom functions when Drive is operated	Upper Control Box
R2 Lower	Relay	Power to Down Trim Solenoid	Chassis Control Box
R2 Upper	Turret Drive Relay	Allows Turret operation while Drive is activated	Upper Control Box
R3 Lower	Relay	Power to Up Jib Solenoid	Chassis Control Box
R3 Upper	Boom Elevate Speed Relay	Power to 'R' Terminal for Boom Up/Down operation	Upper Control Box
R4 Lower	Relay	Power to Down Jib Solenoid	Chassis Control Box
R4 Upper	Drive Enable Relay	Disables drive when Boom functions operated	Upper Control Box
R5	Up Boom Relay	Power to Up Boom Solenoid	Chassis Control Box
R6	Down Boom Relay	Power to Down Boom Solenoid	Chassis Control Box
R7	Extend Boom Relay	Power to Extend Boom Solenoid	Chassis Control Box
R8	Retract Boom Relay	Power to Retract Boom Solenoid	Chassis Control Box
R9	Up Riser Relay	Power to Up Riser Solenoid	Chassis Control Box
R10	Down Riser Relay	Power to Down Riser Solenoid	Chassis Control Box
R11	Cage Right Relay	Power to Cage Right Solenoid	Chassis Control Box
R12	Cage Left Relay	Power to Cage Left Solenoid	Chassis Control Box
R13	Turret Right Relay	Power to Turret Right Solenoid	Chassis Control Box
R14	Turret Left Relay	Power to Turret Left Solenoid	Chassis Control Box
R15	Engine Relay	Enables Engine to operate	Chassis Control Box
R16	Brake Relay	Power to Brake Solenoid	Chassis Control Box
R17	Engine Throttle Relay	Power to Engine Throttle Control	Chassis Control Box
R18	Left Lock Relay	Power to Left Axle Lock Solenoid	Chassis Control Box
R19	Right Lock Relay	Power to Right Axle Lock Solenoid	Chassis Control Box
R20	Horn Relay	Power to Horn	Chassis Control Box
R21	Low Tilt Relay	Disables drive functions and sounds Alarm	Chassis Control Box
R22	Down Relay	Actuated by Limit Switches	Chassis Control Box
R23	Power Relay	Diverts power to Upper/Lower	Chassis Control Box
R24	Torque Relay	High Torque/High Speed	Chassis Control Box
R25	Anti-Restart Relay	Eliminates accidental restart	Chassis Control Box
R26	Pre-Heat Relay	Power to glow plugs	Engine Compartment
RES1	Rheostat	Drive speed control	Drive Control Handle
S1	Trim Switch (two)	Power to Trim Solenoid	Chassis Control Box, Upper Control Box

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
S2	Jib Switch (two)	Power to Jib Solenoid	Chassis Control Box, Upper Control Box
S3	Boom Elevate Switch (two)	Power to Boom Lift Solenoid	Chassis Control Box, Upper Control Box
S4	Boom Extend Switch (two)	Power to Boom Extend Solenoid	Chassis Control Box, Upper Control Box
S5	Riser Switch (two)	Power to Riser Solenoid	Chassis Control Box, Upper Control Box
S6	Cage Switch (two)	Power to Cage Rotate Solenoid	Chassis Control Box, Upper Control Box
S7	Turret Switch (two)	Power to Turret Rotate Solenoid	Chassis Control Box, Upper Control Box
S8	High Torque Switch	High Torque/High Speed	Control Handle
S9	Platform Emergency Stop Switch	Emergency Stop	Upper Control Box
S10	Steer Switch	Power to Left Steer and Right Steer Relays	Upper Control Box, top of Control Handle
S11	Oil Pressure Switch	Stops Engine if low pressure	Engine
S12	Engine Start Switch	Starts Engine	Chassis Control Box
S13	Platform/Chassis Switch	Supplies power to Platform/Chassis	Chassis Control Box
S14	Down Limit Switch	Inhibits cage level, actuates creep speed	Turret at Boom attachment
S15	Chassis Emergency Stop Switch	Emergency Stop	Chassis Control Box
S16	Foot Switch	Enables operation from platform	Floor of platform
S17	Hi/Lo Switch	Selects High Speed or High Torque	Platform Control Box
S18	Platform Key Switch	Enables operation from platform	Platform Control Box
S19	Horn Switch	Sounds Horn	Platform Control Box
S20	Boom Extend Limit Switch	Inhibits cage level, actuates creep speed	On rear of Boom
S21	Intake Air Preheat Switch (two)	Actuate glow plugs for cold start	Chassis Control Box, Upper Control Box
SNSR1	Level Sensor	Provides power to Tilt Relay when level	Engine Compartment
SOL1	Trim UP Solenoid	Controls Cage Level Up Valve	Right side of Manifold
SOL2	Trim Down Solenoid	Controls Cage Level Down Valve	Right side of Manifold
SOL3	Jib Up Solenoid	Controls Jib Lift Valve	Right side of Manifold
SOL4	Jib Down Solenoid	Controls Jib Down Valve	Right side of Manifold
SOL5	Boom Up Solenoid	Controls Boom Lift Valve	Right side of Manifold
SOL6	Boom Down Solenoid	Controls Boom Down Valve	Right side of Manifold
SOL7	Boom Extend Solenoid	Controls Boom Extend Valve	Right side of Manifold
SOL8	Boom Retract Solenoid	Controls Boom Retract Valve	Right side of Manifold
SOL9	Riser Up Solenoid	Controls Riser Lift Valve	Right side of Manifold
SOL10	Riser Down Solenoid	Controls Riser Down Valve	Right side of Manifold
SOL11	Cage Right Solenoid	Controls Cage rotate right	Right side of Manifold
SOL12	Cage Left Solenoid	Controls Cage rotate left	Right side of Manifold
SOL13	Turret Right Solenoid	Controls Turret rotate right	Right side of Manifold
SOL14	Turret Left Solenoid	Controls Turret rotate left	Right side of Manifold
SOL15	Steer Right Solenoid	Controls Steer Valve when steering right	Right side of Manifold
SOL16	Steer Left Solenoid	Controls Steer Valve when steering left	Right side of Manifold
SOL17	Low Flow	Proportionally controls Low Flow Valve	Right side of Manifold
SOL18	High Flow Dump	Controls High Flow Valve	Right side of Manifold
SOL20	LP Lock-off Solenoid	Allows propane to Throttle Body	Engine Compartment

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
SOL21	Brake Solenoid	Releases Brakes	Drive Valve Block
SOL22	High Torque Solenoid	Allows High Torque	Drive Valve Block
SOL23	Axle Lock Solenoid	Locks Axle Cylinder	Drive Valve Block
SOL24	Engine Speed Solenoid	Throttle control solenoid	Engine Compartment

SCHEMATICS

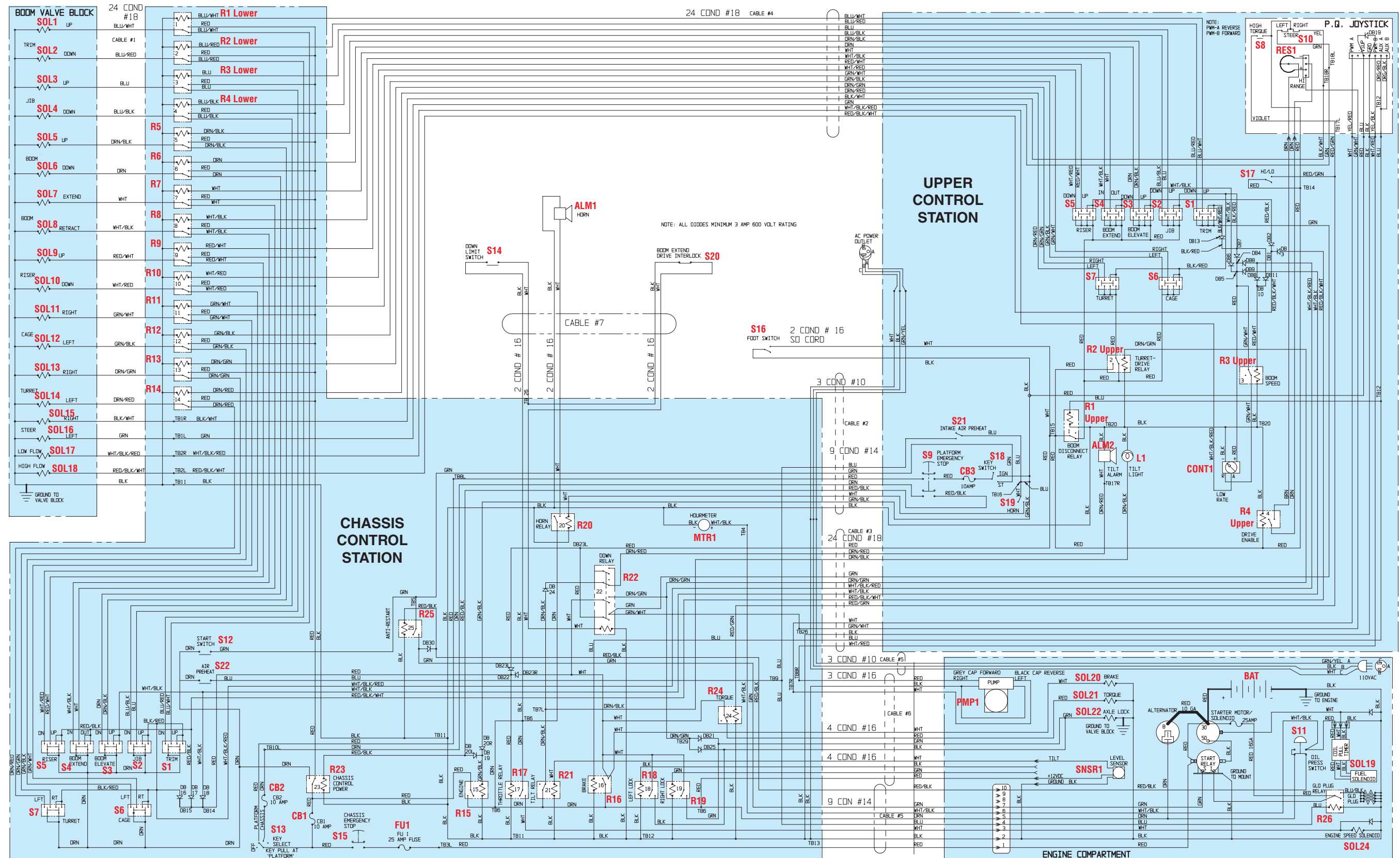


Figure 5-3: Electrical Schematic, Kubota Diesel 068341-033

5.4 HYDRAULIC SCHEMATIC - 4-VALVE DRIVE BLOCK

Table 5-4: Hydraulic Schematic Legend - 068340-004

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
BRK1	Left Brake	Release left brake	Left rear wheel
BRK2	Right Brake	Release right brake	Right rear wheel
CB1	Counterbalance Valve, Turret Rotate	Limit pressure to turret rotate motor	Boom Valve Block
CB2	Counterbalance Valve, Riser	Limit pressure to riser cylinder	Riser Cylinder
CB3	Counterbalance Valve, Boom Extend	Limit pressure to boom extend cylinder	Boom Extend Cylinder
CB4	Counterbalance Valve, Boom Raise	Limit pressure to boom cylinder	Boom Raise Cylinder
CB5	Counterbalance Valve, Jib	Limit pressure to jib cylinder	Jib Cylinder
CB6 (2)	Counterbalance Valve, Master	Limit pressure to master cylinder	Master Cylinder
CB7 (2)	Counterbalance Valve, Slave	Limit pressure to slave cylinder	Slave Cylinder
CB8 (2)	Counterbalance Valve, Cage Rotate	Limit pressure to cage rotate cylinder	Cage Rotate Cylinder
CV1	Check Valve, Drive Motors	Flow check	Drive Pump
CV2-CV8	Check Valve, Low Relief	Flow check, low pressure	Boom Valve Block
CV9-10	Check Valve, High Relief	Flow check, high pressure	Boom Valve Block
CV11(2)	Check Valve, Brake Release	Flow check, brake cylinders	Drive Valve Block
CV12	Check Valve, High	Flow check	Boom Pump
CV13	Check Valve, Low	Flow check	Boom Pump
CV14 (2)	Check Valve, Hand Pump	Controls flow from hand pump through diverter valve	Boom Valve Block
CV15 (2)	Check Valve, Cage Rotate	Reduces pressure for smooth cage rotate operation	Boom Valve Block
CV16	Check Valve, Jib Lower	Sends oil through ORF16 to slow jib lowering	Boom Valve Block
CV17	P.O. Check Valve	Axle Float check	Left Axle Cylinder
CV18	P.O. Check Valve	Axle Float check	Right Axle Cylinder
CYL1	Steering Cylinder	Actuates steering linkage to steer front wheels	Front Axle Assembly
CYL2	Riser Cylinder	Raise elevating assembly	Elevating Assembly
CYL3	Boom Extend Cylinder	Extend boom	Inside Boom
CYL4	Boom Raise Cylinder	Raise elevating assembly	Elevating Assembly
CYL5	Jib Cylinder	Raise jib	Jib
CYL6	Master Cylinder	Maintain cage level	Rear of Boom
CYL7	Slave Cylinder	Maintain cage level	Front of Boom
CYL8	Cage Rotate Cylinder	Rotate cage	Between cage and Jib
CYL11	Left Axle Cylinder	Adjust front axle	Front Axle
CYL12	Right Axle Cylinder	Adjust front axle	Front Axle
FL1	Filter, Return	Keep oil clean	Boom Valve Block
FL2	Filter, Suction Strainer	Keep oil clean	Hydraulic Reservoir
FL3	Filter, Return	Keep oil clean	Drive Pump
FL4	Filter, Suction Strainer	Keep oil clean	Hydraulic Reservoir
MOT1	Motor, Drive	Drive motor	Left Rear
MOT2	Motor, Drive	Drive motor	Right Front
MOT3	Motor, Drive	Drive motor	Right Rear
MOT4	Motor, Drive	Drive motor	Left Front
MOT5	Motor, Slew	Slew motor	Bottom of Turret
ORF11 (2)	Brake Apply Orifice	Allows free flow to brakes	Drive Valve Block
ORF16	Jib Down Orifice	Limits descent speed of the jib	Jib Cylinder
PMP1	Drive Pump	Provides fluid power for drive system	Chassis

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
PMP2	Boom Pump	Provides fluid power for boom system	Chassis
PMP3	Hand Pump	Pump up brake release for towing	Boom Valve Block
RV1	High Pressure Relief Valve	Limits maximum pressure	Boom Valve Block
RV2	Low Pressure Relief Valve	Limits maximum pressure	Boom Valve Block
RV3	Relief Valve, Drive Pump	Control drive pump pressure	Drive Pump
V1	Steering Valve	Controls oil flow to steering cylinder	Top of Manifold, ports marked 'D'
V2	Riser Valve	Controls oil flow to riser cylinder	Front of Manifold
V3	Boom Extend Valve	Controls oil flow to boom extend cylinder	Boom Valve Block
V4	Boom Raise Valve	Controls oil flow to boom raise cylinder	Boom Valve Block
V5	Jib Valve	Controls oil flow to jib cylinder	Boom Valve Block
V6	Trim/Level Valve	Controls oil flow to master cylinder	Boom Valve Block
V8	Cage Rotate Valve	Controls low flow to cage rotate cylinder	Boom Valve Block
V9	Turret Rotate Valve	Controls oil flow to slew motor	Boom Valve Block
V10	Brake Release Valve	Release brakes	Drive Valve block
V11	Left Axle Cylinder Valve	Controls left axle cylinder	Drive Block
V12	Right Axle Cylinder Valve	Controls left axle cylinder	Drive Block
V13	High Torque Valve	Allows High Speed when shifted	Drive Block
V14	High Dump Rate	Power to riser and boom extend cylinders	Boom Valve Block
V15	Diverter Valve	Allows hand pump to function	Boom Valve Block
V16	Low Rate Valve	Flow control for Low Rate functions	Boom Valve Block

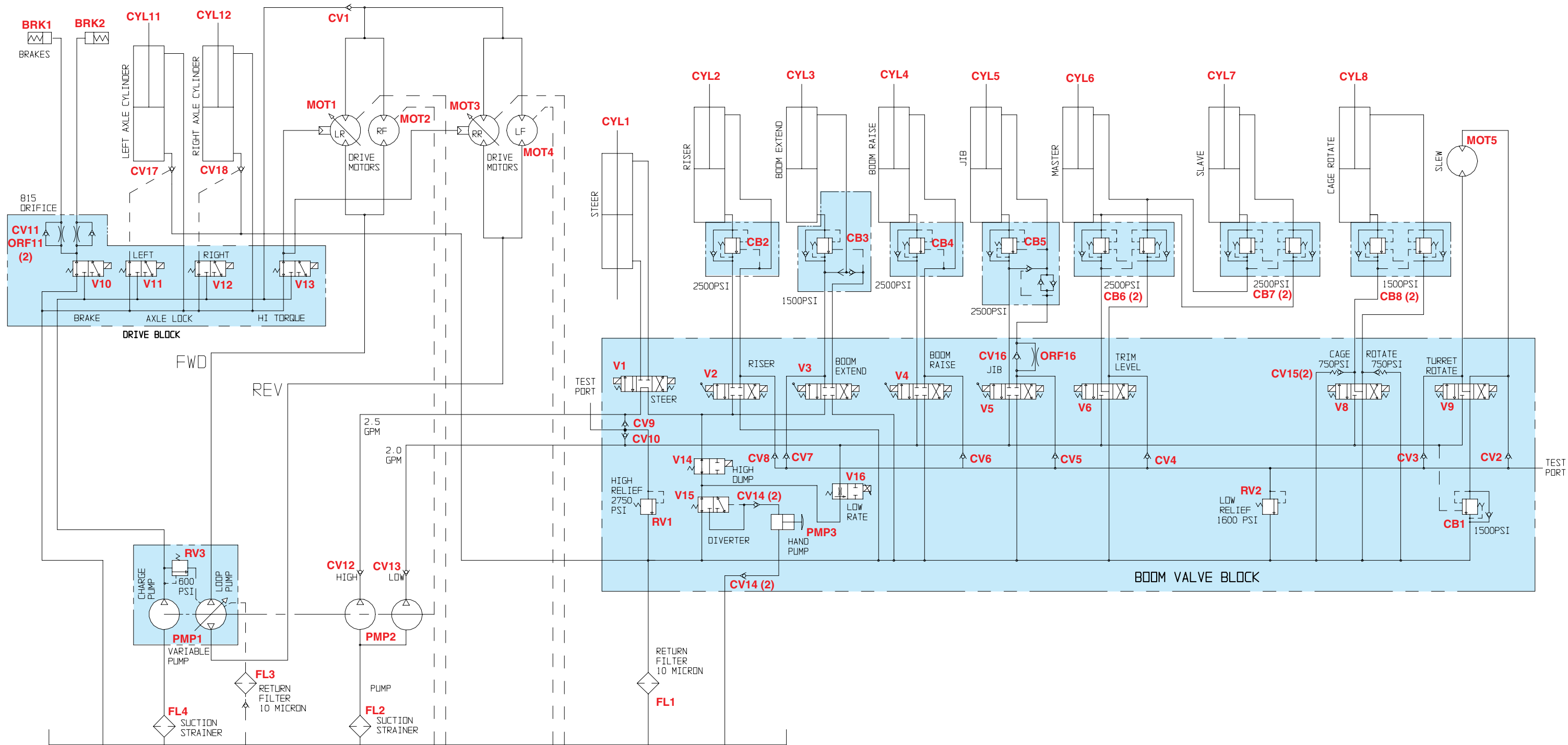


Figure 5-4: Hydraulic Schematic - 068340-004 - 4-Valve Drive Block

5.5 HYDRAULIC SCHEMATIC - 3-VALVE DRIVE BLOCK

Table 5-5: Hydraulic Schematic Legend - 068340-005

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
BRK1	Left Brake Cylinder	Release left brake	Left brake
BRK2	Right Brake Cylinder	Release right brake	Right brake
CB1	Counterbalance Valve, Turret Rotate	Limit pressure to turret rotate motor	Boom Valve Block
CB2	Counterbalance Valve, Riser	Limit pressure to riser cylinder	Riser Cylinder
CB3	Counterbalance Valve, Boom Extend	Regulate pressure to boom extend cylinder	Boom Extend Cylinder
CB4	Counterbalance Valve, Boom Raise	Regulate pressure to boom cylinder	Boom Raise Cylinder
CB5	Counterbalance Valve, Jib	Regulate pressure to jib cylinder	Jib Cylinder
CB6 (2)	Counterbalance Valve, Master	Regulate pressure to master cylinder	Master Cylinder
CB7 (2)	Counterbalance Valve, Slave	Regulate pressure to slave cylinder	Slave Cylinder
CB8 (2)	Counterbalance Valve, Cage Rotate	Regulate pressure to cage rotate cylinder	Cage Rotate Cylinder
CB9	Counterbalance Valve, Pump High Pressure	Regulate charge pump pressure	Drive Variable Pump
CV2-CV8	Check Valve, Low Relief	Flow check, low pressure	Boom Valve Block
CV9-10	Check Valve, High Relief	Flow check, high pressure	Boom Valve Block
CV12	Check Valve, High	Flow check	Boom Pump
CV13	Check Valve, Low	Flow check	Boom Pump
CV14 (2)	Check Valve, Hand Pump	Controls flow from hand pump through diverter valve	Boom Valve Block
CV15 (2)	Check Valve, Cage Rotate	Reduces pressure for smooth cage rotate operation	Boom Valve Block
CV16	Check Valve, Jib Lower	Sends oil through ORF16 to slow jib lowering	Boom Valve Block
CV17	P.O. Check Valve	Axle Float check	Left Axle Cylinder
CV18	P.O. Check Valve	Axle Float check	Right Axle Cylinder
CV19	Check Valve, Cage Rotate	Flow check	Boom Valve Block
CV20	Check Valve, Drive Block	Flow check	Drive Valve Block
CV21 & 22	Check Valve, Loop Pump	Flow check	Drive Variable Pump
CYL1	Steering Cylinder	Actuates steering linkage to steer front wheels	Front Axle Assembly
CYL2	Riser Cylinder	Raise elevating assembly	Elevating Assembly
CYL3	Boom Extend Cylinder	Extend boom	Inside Boom
CYL4	Boom Raise Cylinder	Raise elevating assembly	Elevating Assembly
CYL5	Jib Cylinder	Raise jib	Jib
CYL6	Master Cylinder	Maintain cage level	Rear of Boom
CYL7	Slave Cylinder	Maintain cage level	Front of Boom
CYL8	Cage Rotate Cylinder	Rotate cage	Between cage and Jib
CYL11	Left Axle Cylinder	Adjust front axle	Front Axle
CYL12	Right Axle Cylinder	Adjust front axle	Front Axle
FL1	Filter, Return	Keep oil clean	Boom Valve Block
FL2	Filter, Suction Strainer	Keep oil clean	Hydraulic Reservoir
FL3	Filter, Return	Keep oil clean	Drive Pump
FL4	Filter, Suction Strainer	Keep oil clean	Hydraulic Reservoir
MOT1	Motor, Drive	Drive motor	Left Rear
MOT2	Motor, Drive	Drive motor	Right Front
MOT3	Motor, Drive	Drive motor	Right Rear
MOT4	Motor, Drive	Drive motor	Left Front
MOT5	Motor, Slew	Slew motor	Bottom of Turret
ORF16	Orifice, Jib Down	Limits descent speed of the jib	Jib Cylinder

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ORF19	Orifice, Cage Rotate	Limits pressure to cage rotate valve	Boom Valve Block
PMP1	Pump, Drive	Provides fluid power for drive system	Chassis
PMP2	Pump, Boom	Provides fluid power for boom system	Chassis
PMP3	Hand Pump	Pump up system for emergency lowering	Boom Valve Block
RV1	Relief Valve, High Pressure	Limits maximum pressure	Boom Valve Block
RV2	Relief Valve, Low Pressure	Limits maximum pressure	Boom Valve Block
RV3	Relief Valve, Drive Charge Pump	Regulate charge pump pressure	Drive Variable Pump
RV4 & 5	Main Relief Valves, Drive Loop Pump	Regulate pressure to drive motors	Drive Variable Pump
RV6	Relief Valve, Displacement Valve	Equalize pressure to drive motors	Drive Variable Pump
RV7	Relief Valve, Drive Block	Regulate pressure to drive motors	Drive Valve Block
V1	Steering Valve	Controls oil flow to steering cylinder	Top of Manifold, ports marked 'D'
V2	Riser Valve	Controls oil flow to riser cylinder	Front of Manifold
V3	Boom Extend Valve	Controls oil flow to boom extend cylinder	Boom Valve Block
V4	Boom Raise Valve	Controls oil flow to boom raise cylinder	Boom Valve Block
V5	Jib Valve	Controls oil flow to jib cylinder	Boom Valve Block
V6	Trim/Level Valve	Controls oil flow to master cylinder	Boom Valve Block
V8	Cage Rotate Valve	Controls low flow to cage rotate cylinder	Boom Valve Block
V9	Turret Rotate Valve	Controls oil flow to slew motor	Boom Valve Block
V10	Brake Release Valve	Release brakes	Drive Valve block
V11	Axle Cylinder Valve	Controls axle cylinders	Drive Block
V13	High Torque Valve	Allows High Speed when shifted	Drive Block
V14	High Dump Rate	Power to riser and boom extend cylinders	Boom Valve Block
V15	Diverter Valve	Allows hand pump to function	Boom Valve Block
V16	Low Rate Valve	Flow control for Low Rate functions	Boom Valve Block
V17	Displacement Control Valve	Controls drive pump displacement	Drive Variable Pump

Section 5.5

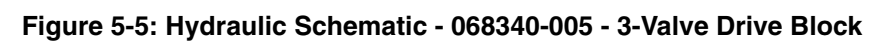


Table 5-6: Boom Valve Block Legend

ITEM	DESCRIPTION
29	FITTING, 90ø EL. 6MB-6MJ
30	HAND GRIP, VINYL
31	FITTING, 2062-6-4S
32	SCREW BUTT HEAD 1/4-20 UNC X 1/2
33	SCREW BUTT HEAD, 5/16-18 UNC X 3/4
34	LANYARD ASSEMBLY
35	FITTING 202702-6-6S
36	ORIFICE
37	VALVE
38	STEEL BALL 7/16 DIA
39	BACKET
40	CONNECTOR RING, 18-14 GA. #8
41	CONNECTOR, FEMALE, PUSH, .25
42	WIRE, 16 GA. BLACK

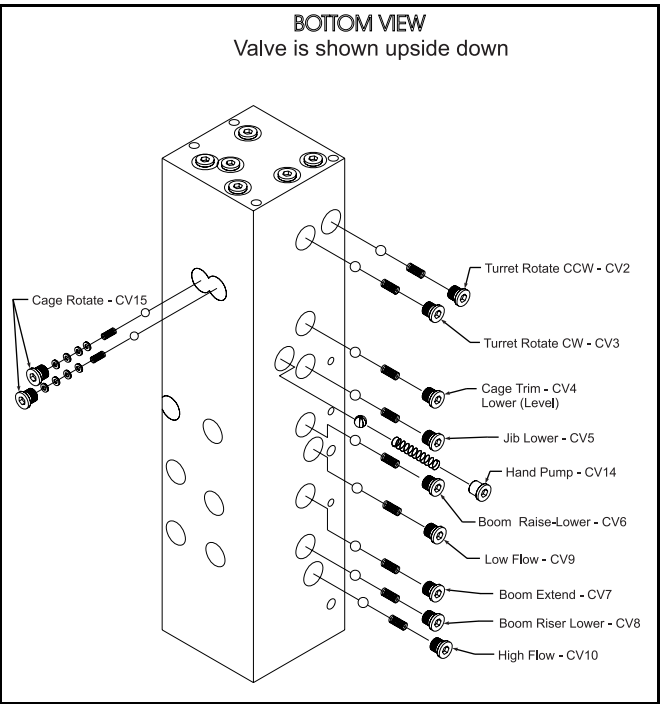


Figure 5-7: Check Ports

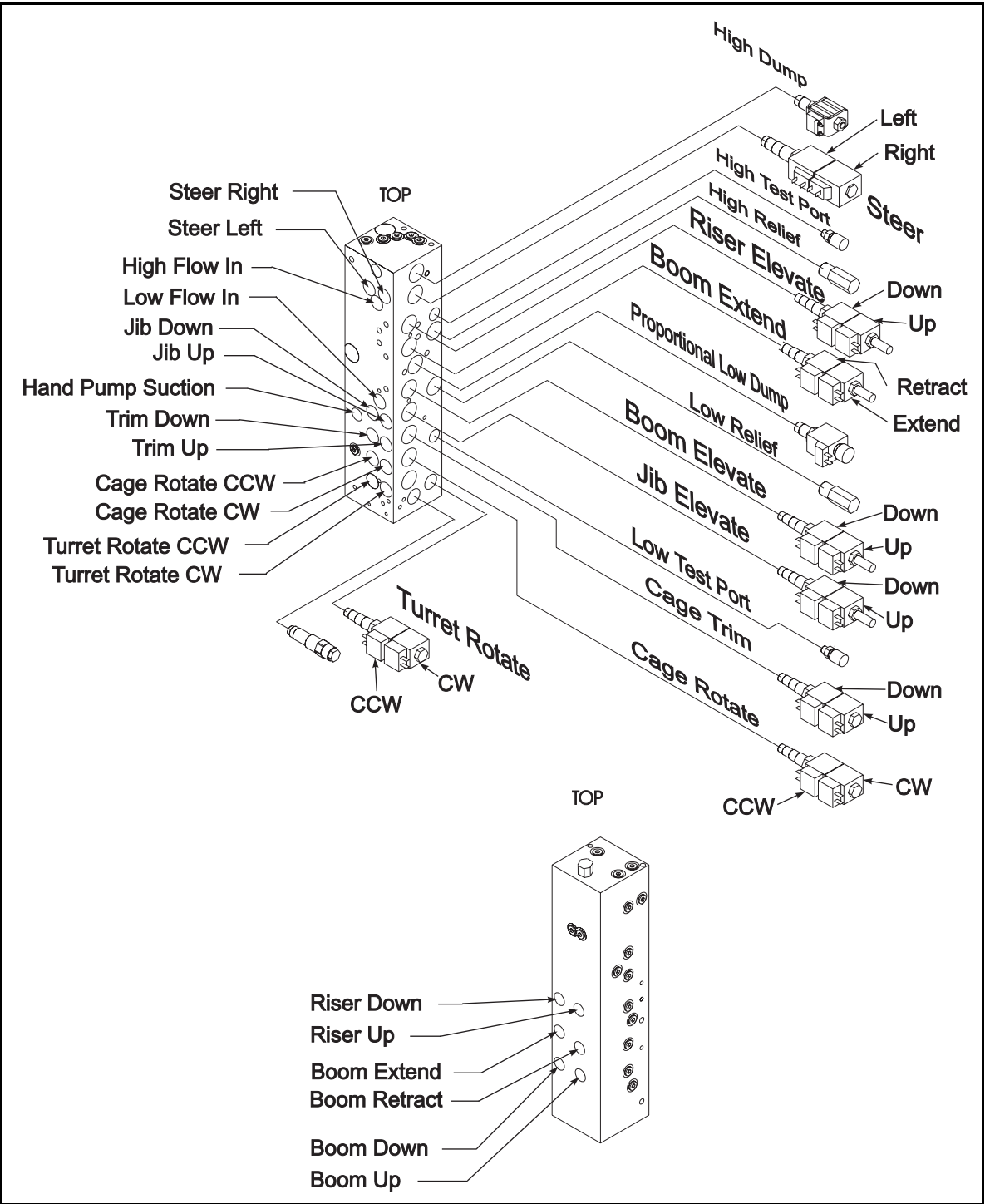


Figure 5-8: Hydraulic Valve Ports

5.7 DRIVE VALVE BLOCK ASSEMBLY

Table 5-7: Drive Valve Block Legend

ITEM	DESCRIPTION
1	Valve Block
2	Valve Spool, 2 Position - 3 Way
3	Guage Port
4	Adapter, 90ø - 6MB - 4MJ
5	Adapter, 90ø - 6MB - 6MJ
6	Adapter, Long, 90ø - 4MB - 4MJ
7	Adapter, 90ø - 4MB - 4MJ
8	Plug, #4 SAE
9	Orifice, Cessna #16097-805
10	Adapter, Straight, 4MB-4MJ
12	Tee Fitting, 6MB-6MJ-6MJ

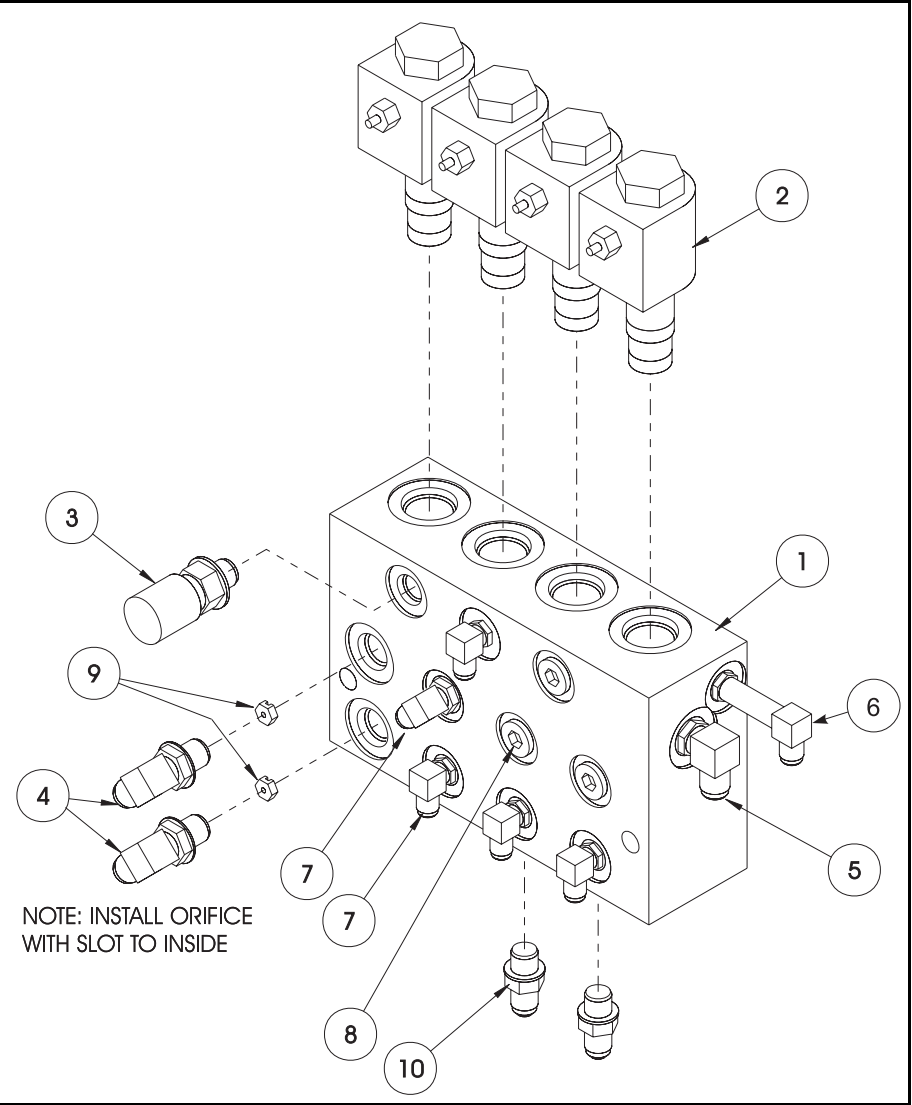


Figure 5-9: Drive Valve Block - 4-Valve Type

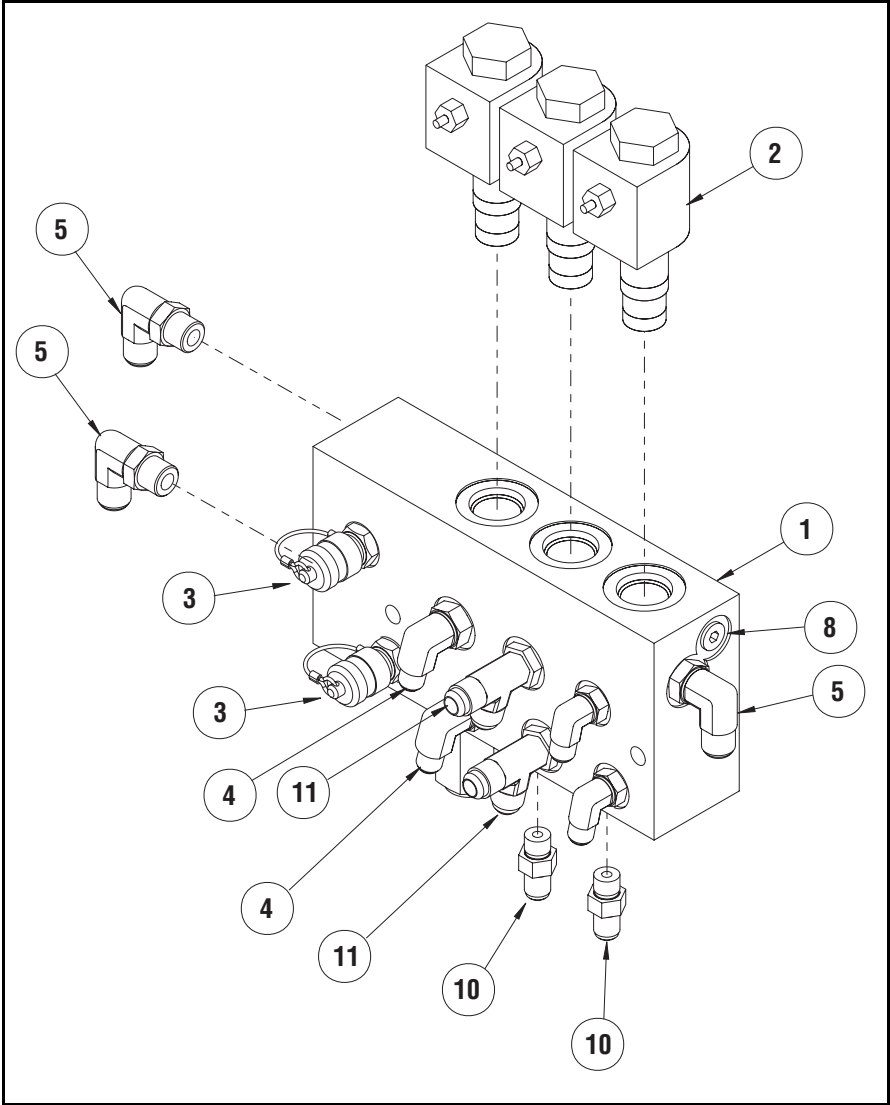


Figure 5-10: Drive Block - 3-Valve Type

5.8 UPPER CONTROL BOX COMPONENT LOCATION

Table 5-8: Upper Control Box Components

		Gas Model	Diesel Model
1	Emergency Stop Button	X	X
2	LP/Gas Switch	X	
3	Horn	X	X
4	Out of Level Lamp	X	X
5	Switch, Torque, Hi/Low	X	X
6	Switch, Jib Control	X	X
7	Switch, Boom Extend	X	X
8	Switch, Upper Boom	X	X
9	Switch, Riser Control	X	X
10	Rheostat, Controller	X	X
11	Joystick	X	X
12	Key Switch/Engine Start	X	X
13	Terminal Strip	X	X

		Gas Model	Diesel Model
14	Cable Connector, 3/4	X	X
15	Switch, Platform Level	X	X
16	Switch, Platform Rotate	X	X
17	Switch, Turret Rotate	X	X
18	Cable Connector, 1/2	X	X
19	Circuit Breaker, 10 amp	X	X
20	Terminal End	X	X
21	End Cap, Contact Block	X	X
22	Terminal Block, Tan	X	X
23	Terminal Block, Blue	X	X
24	Terminal Block, Orange	X	X
25	Relay, SPDT, 48 Volt	X	X

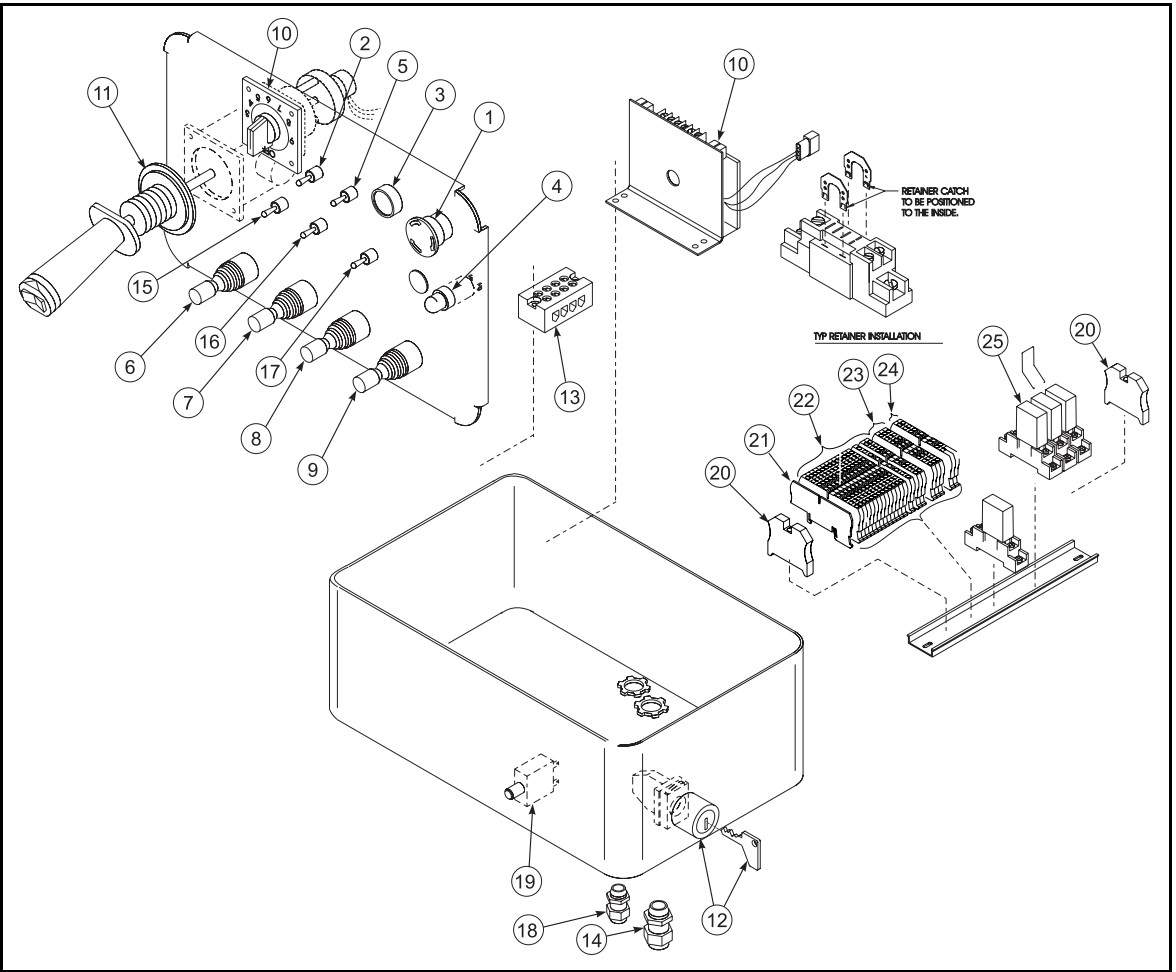


Figure 5-11: Upper Controller

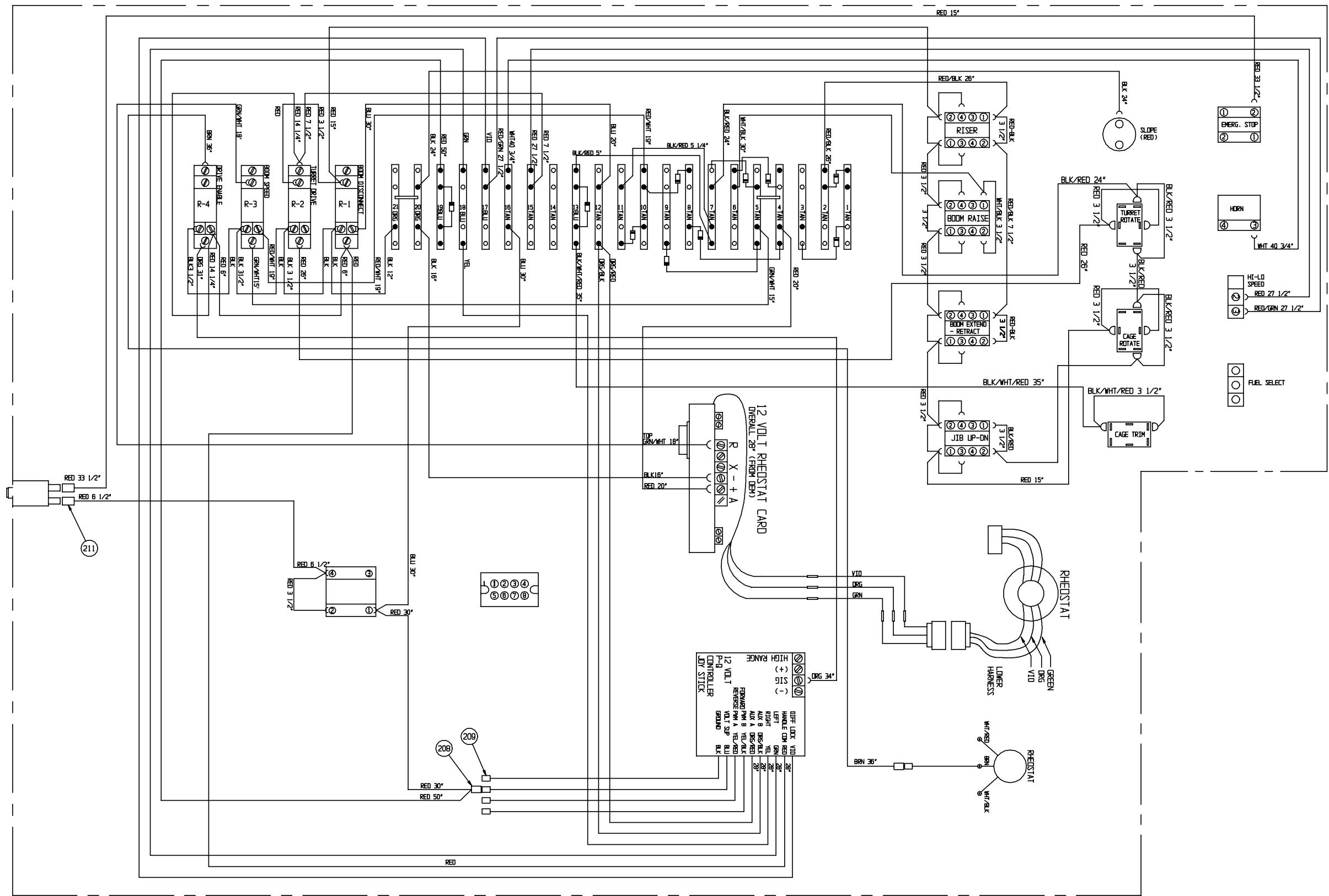


Figure 5-12: Electrical Diagram, Upper Control Box, Gasoline Model - 068329-006#2

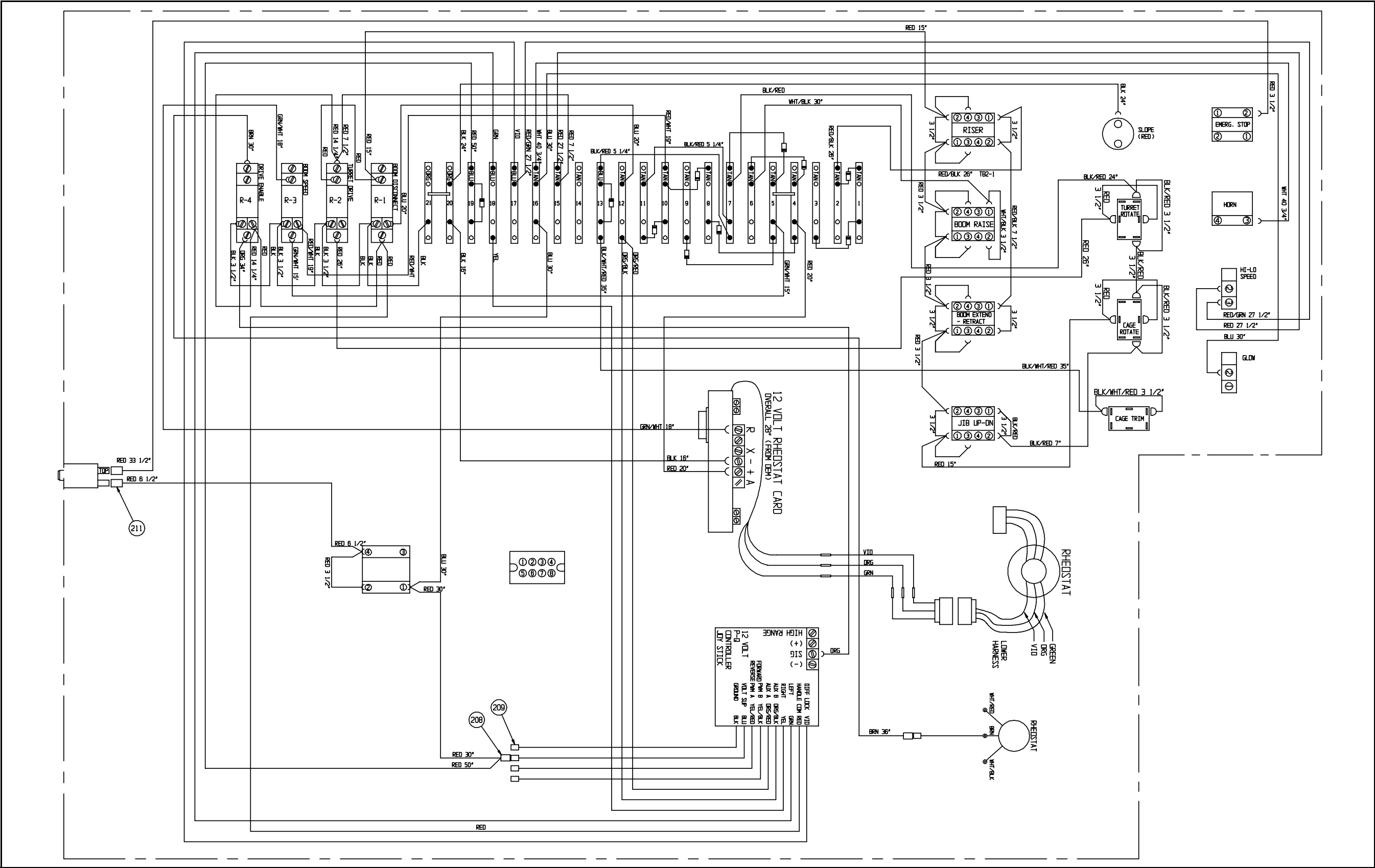


Figure 5-13: Electrical Diagram, Upper Control Box, Diesel Model - 068329-007#2

5.9 CHASSIS CONTROL BOX COMPONENT LOCATION

Table 5-9: Lower Control Box Components

ITEM	DESCRIPTION
1.	Emergency Stop Button
2.	Engine Start Button
3.	Choke/Glow Plug
4.	Key Switch
5.	Fuse (25A)
6.	Riser Switch
7.	Boom Raise Switch
8.	Boom Extend Switch
9.	Jib Extend Switch
10.	Turret Rotate
11.	Cage Rotate Switch
12.	Cage Level Switch
13.	Hour Meter
14.	Circuit Breaker

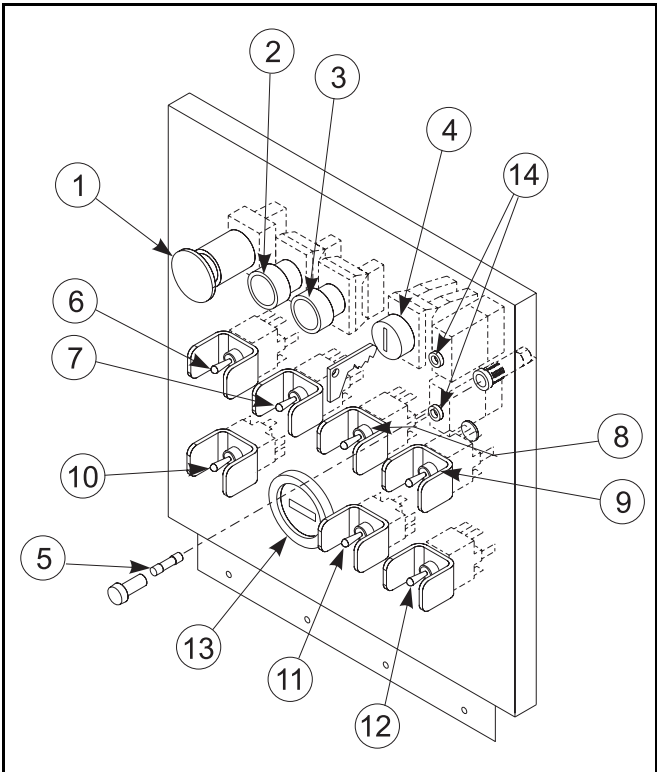


Figure 5-14: Lower Control Box Cover

Table 5-10: Lower Control Box Terminal Strip Components

ITEM	DESCRIPTION
1.	Cord Grip, 3/4"
2.	Terminal Strip (120VAC)
3.	End Block
4.	Jumper, 2 pin
5.	Terminal Block (blue)
6.	Terminal Block (tan)
7.	Relay, SPDT
8.	Retainer Clip, 1 pole
9.	Socket, Four Relay
10.	Retainer Clip, 4 pole
11.	Relay, 12 VDC, 4 pole
12.	End Block, Terminal
13.	Jumper, 3 pin
14.	Terminal Block (orange)
15.	Socket, Single Relay

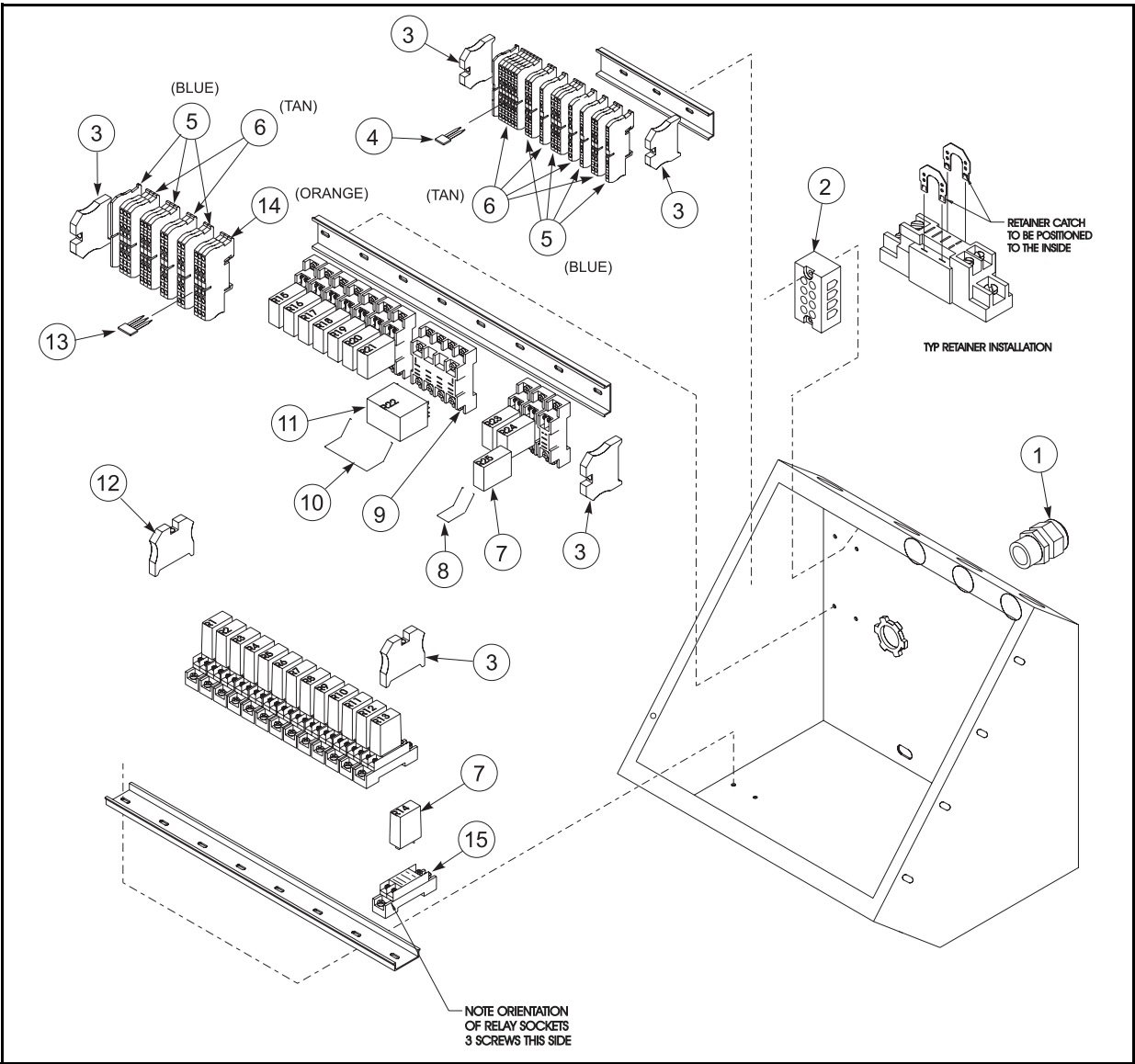


Figure 5-15: Terminal Strip Relay Identification (Diesel Model Shown)

Section 5.9



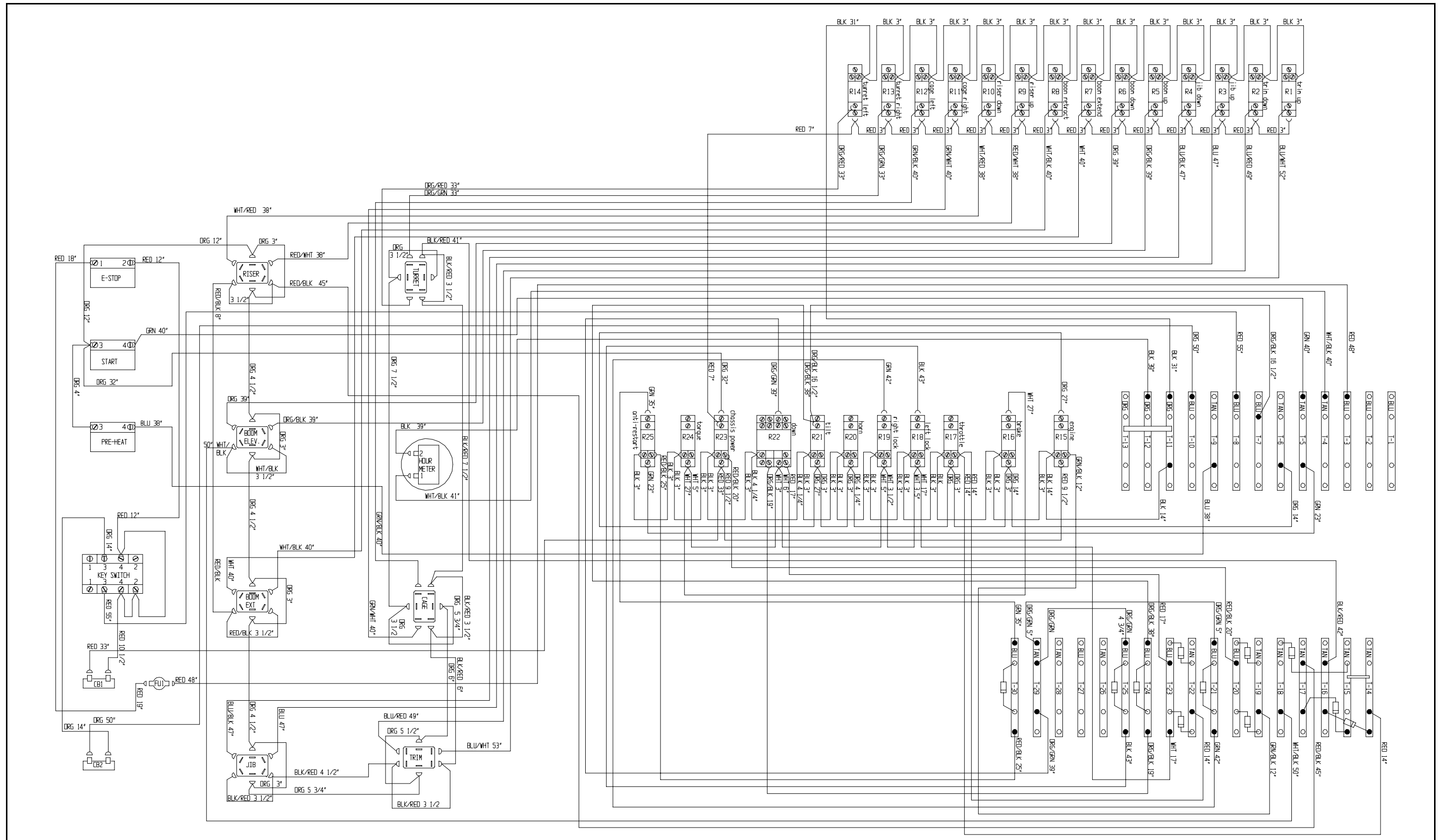


Figure 5-17: Electrical Diagram, Lower Control Box, Diesel Models - 068328-005#3

ILLUSTRATED PARTS BREAKDOWN

INTRODUCTION

This section lists and illustrates the replaceable assemblies and parts of this product, as manufactured by UpRight, Inc.

Each parts list contains the component parts for that assembly.

NOTE: Modifications to the machine's power and drive systems required changes to assembly drawings. To determine which drawings apply to your machine;

- 1.) Open the engine compartment and look at the label on one of the drive motors.
- 2.) Look at the valve cover on the engine. Nissan and Kubota engines have their name embossed on top of the valve cover.

Early models use Ford gasoline engine, John Deere diesel engine, and Sauer Sundstrand hydraulic drive motors and related components

Late models use Nissan gasoline engine, Kubota diesel engine, and Sauer Danfoss hydraulic drive motors and related components

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068316-015	6-31	Engine Assembly, Ford Dual Fuel	
Chassis Assembly, JD Diesel		068871-001	6-60
068316-011	6-36	Engine Assembly, Nissan Dual Fuel	
Chassis Assembly, JD Diesel		109131-000	6-64
068316-014	6-40	Engine Assembly, John Deere Diesel	
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109117-000	6-46	Lower Control Box Assembly, Gas	
Axle Lock Cylinder Assembly		068328-006	6-70
109093-000	6-47	Lower Control Box Assembly, Diesel	
Steering Cylinder Assembly		068328-005	6-74
109092-000	6-47	Upper Control Box Assembly, Gas	
Front Axle Assembly		068329-006	6-78
109114-000	6-48		

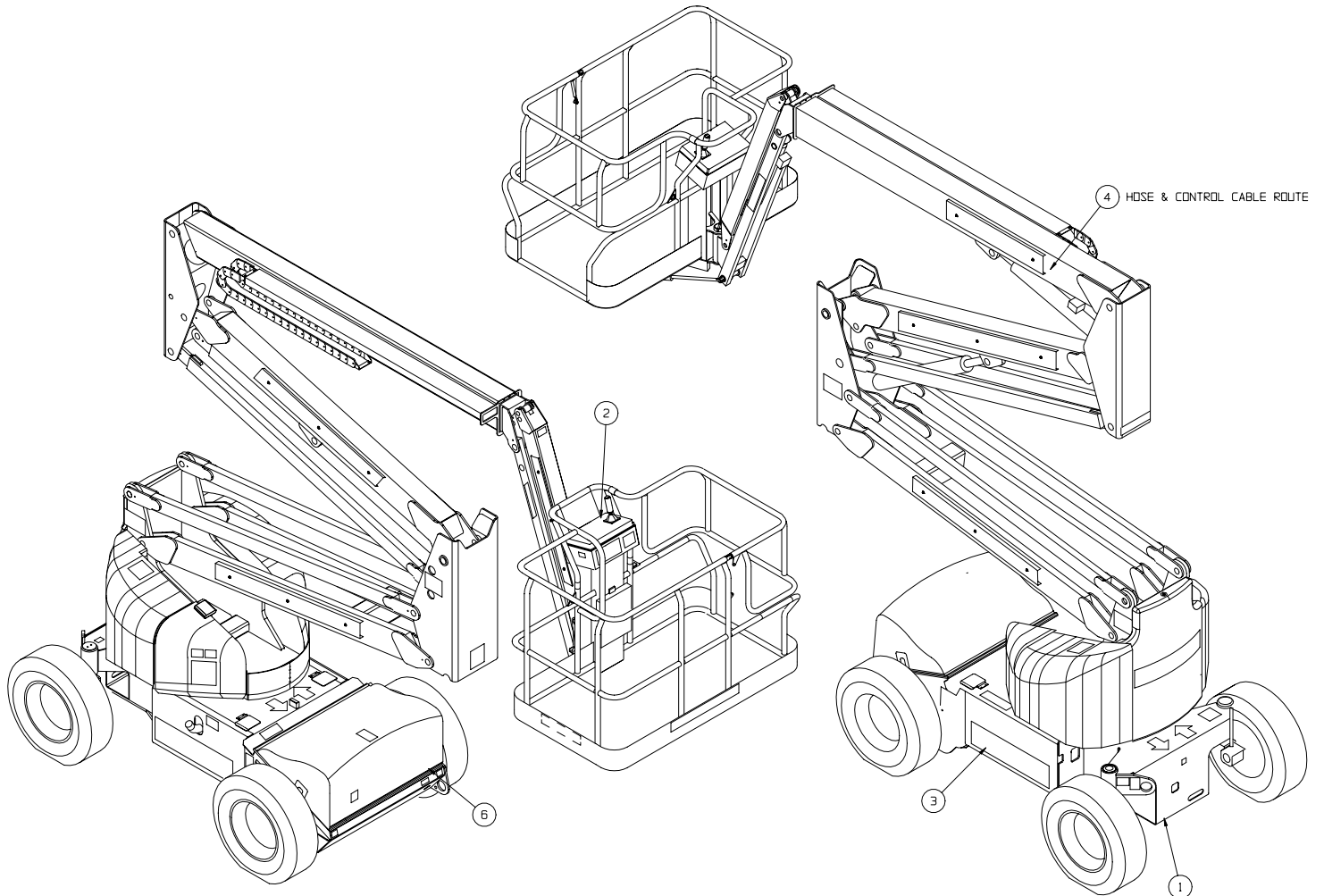
Illustrated Parts Breakdown

Upper Control Box Assembly, Diesel		Fuel tank Assembly, Gas	
068329-007	6-82	109052-000	6-97
Valve Block Sub-Assembly		Fuel Tank Assembly, Diesel	
068349-001	6-85	068710-001	6-98
Valve Block Assembly		Hydraulic Tank Assembly	
068348-002	6-86	069205-000	6-99
Drive Valve Block Assembly		Label Kit, Gas	
068953-000 Four Valve Type 	6-88	068335-004 - Gas	6-100
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Hose Kit - 4-Valve Drive Block		068327-004, -005	6-101
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Controller Installation, Gas		068294-000	6-104
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Controller Installation, Diesel		068325-000	6-105
068339-008	6-95	Four Foot Platform Option	
Platform 'B' Assembly		068325-003	6-106
068325-001	6-96		

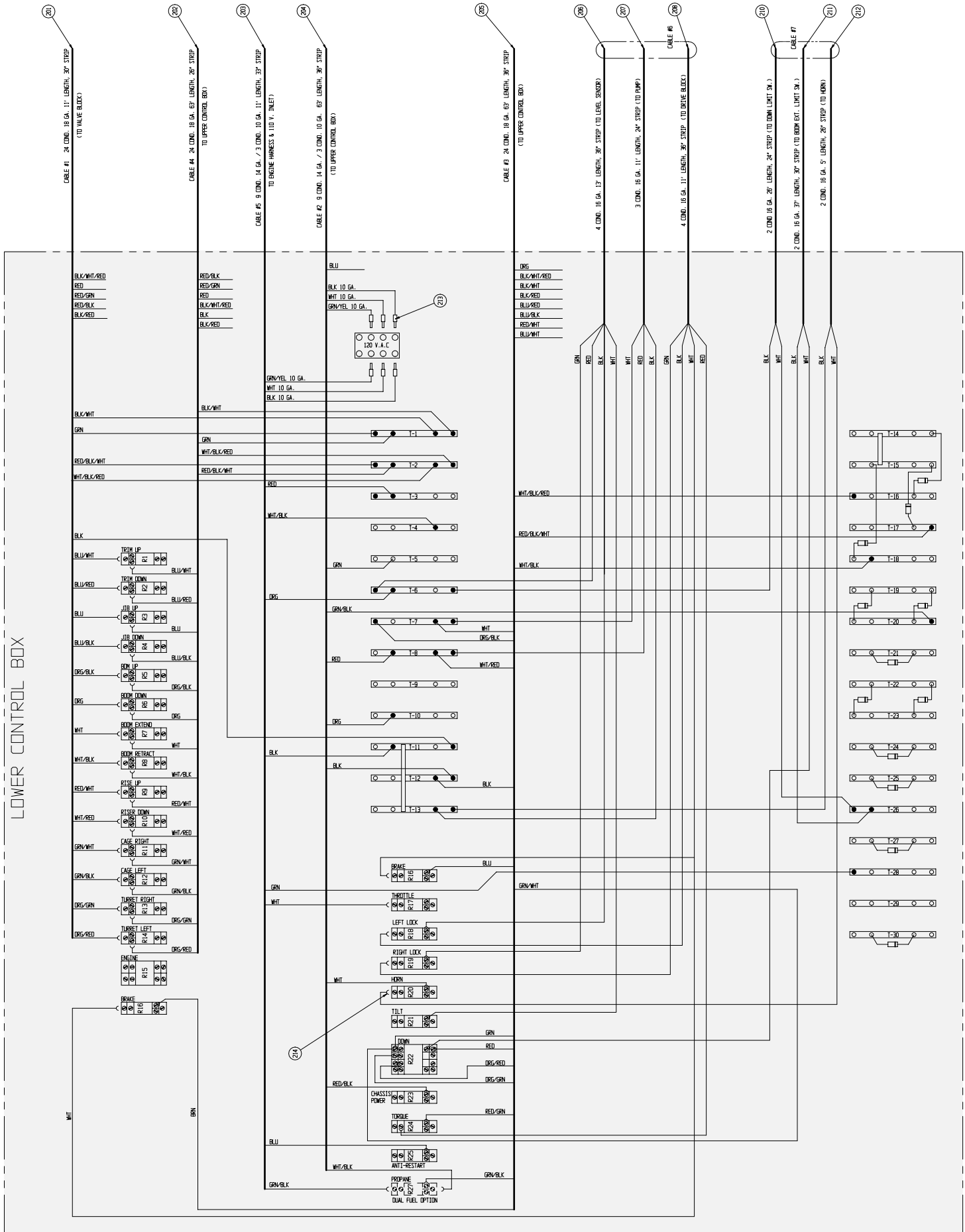
Final Assembly, Ford Dual Fuel

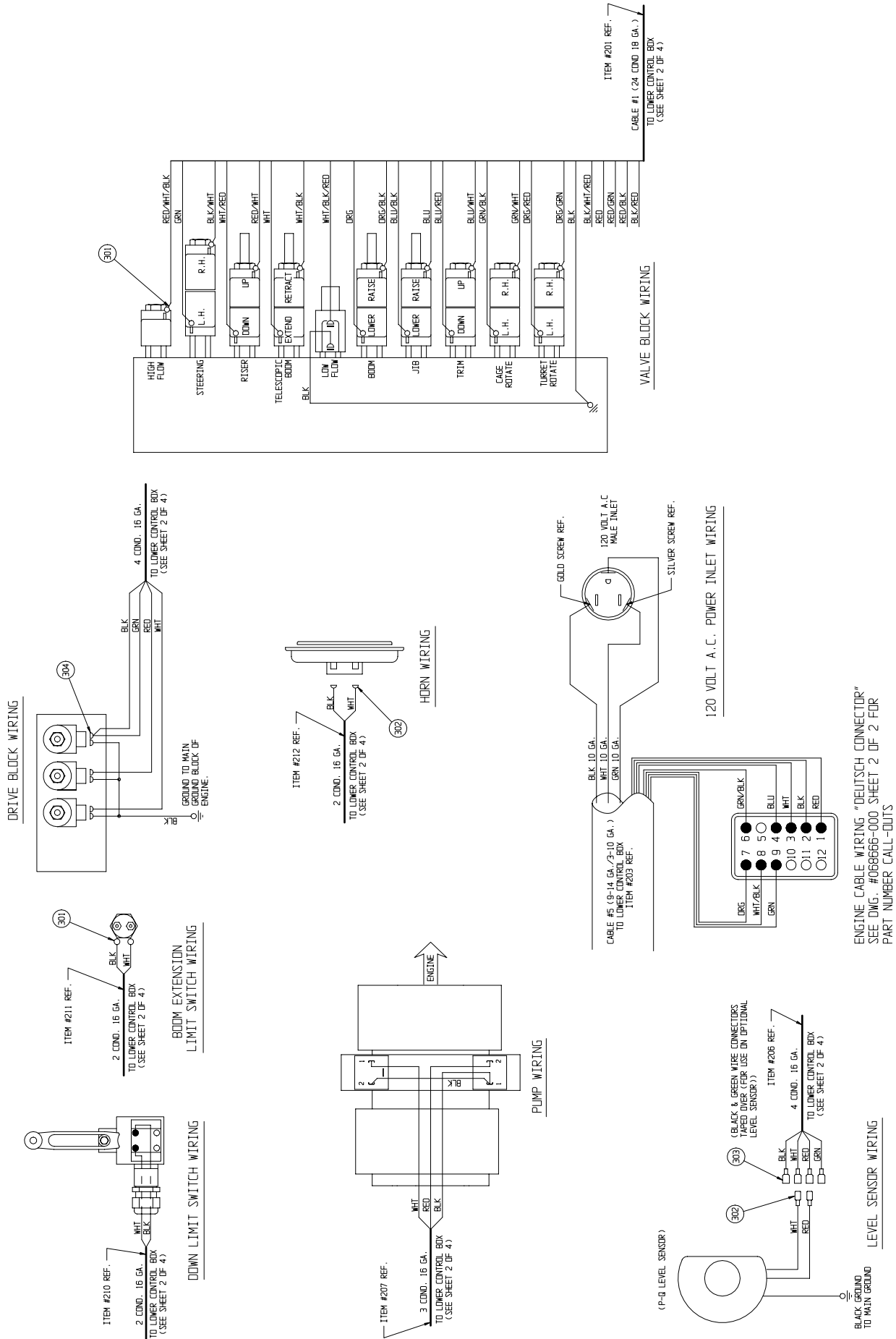
068311-000

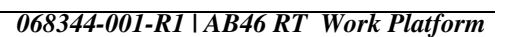
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068314-000	BASIC ASSEMBLY	1	207	029447-099	WIRE, 3 COND. 16 GA.	24 FT
2	068339-007	CONTROLLER INSTALLATION	1	208	029498-099	WIRE, 4 COND. 16 GA.	11 FT
3	068335-004	LABEL KIT/INSTALLATION	1	210	029496-099	WIRE, 2 COND. 16 GA.	26 FT
4	068336-005	HOSE KIT/INSTALLATION	1	211	029496-099	WIRE, 2 COND. 16 GA.	37 FT
6	029945-014	LEVEL SENSOR	1	212	029496-099	WIRE, 2 COND. 16 GA.	5 FT
9	060540-002	DOCUMENTATION KIT	1	213	068814-000	TERMINAL, PIN	6
10	068344-000	SERVICE MANUAL	1	214	029610-006	TERMINAL, FORK 18-16 #6	45
1000	110100-000	PRODUCT SPECIFICATION SHEET	REF	301	029601-005	TERMINAL, RING 18-22 GA. #10	22
1001	068341-032	ELECTRICAL SCHEMATIC	REF	302	029931-003	TERMINAL, FEM. PUSH-ON 16-14	12
1002	068340-005	HYDRAULIC SCHEMATIC	REF	303	014914-001	TERMINAL, MALE PUSH-ON 18-22 .25	3
201	029443-099	CABLE, 24 COND. 18 GA.	11 FT	304	029931-001	TERMINAL, FEM. PUSH-ON 18-22 .25	1
202	029433-099	CABLE, 24 COND. 18 GA.	63 FT	401	029440-099	WIRE, 3 COND 12 GA. SO.	2 FT
203	029434-099	CABLE, 3-10 GA. / 9-14 GA.	11 FT	402	029490-099	WIRE, 2 COND. 16 GA. SO.	8 FT
204	029434-099	CABLE, 3-10 GA. / 9-14 GA.	63 FT	403	029496-099	WIRE, 2 COND. 16 GA.	2 FT
205	029433-099	CABLE, 24 COND. 18 GA.	63 FT				
206	029498-099	WIRE, 4 COND. 16 GA.	13 FT				



Drawing # 1 of 4





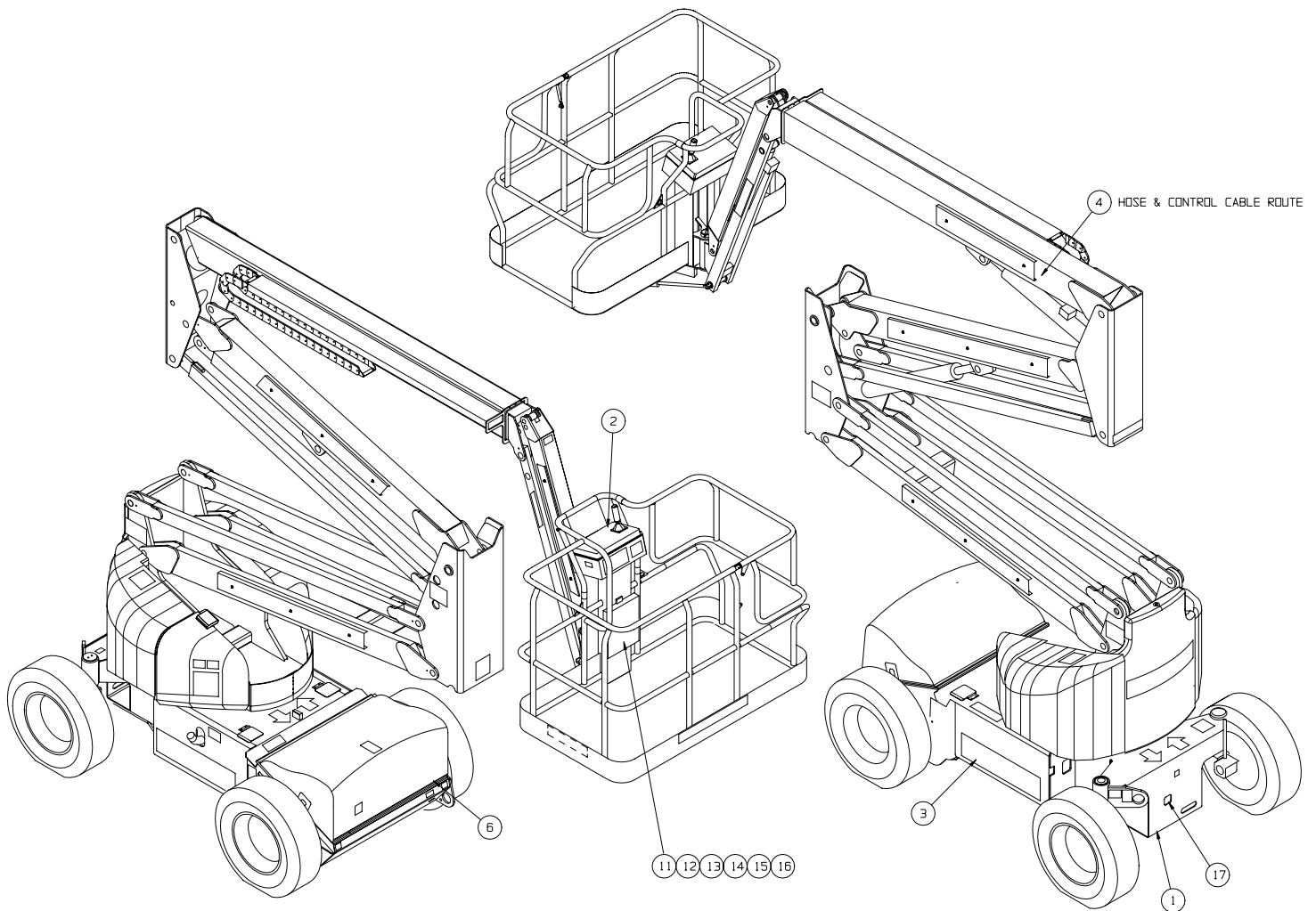


Final Assembly, Nissan Dual Fuel

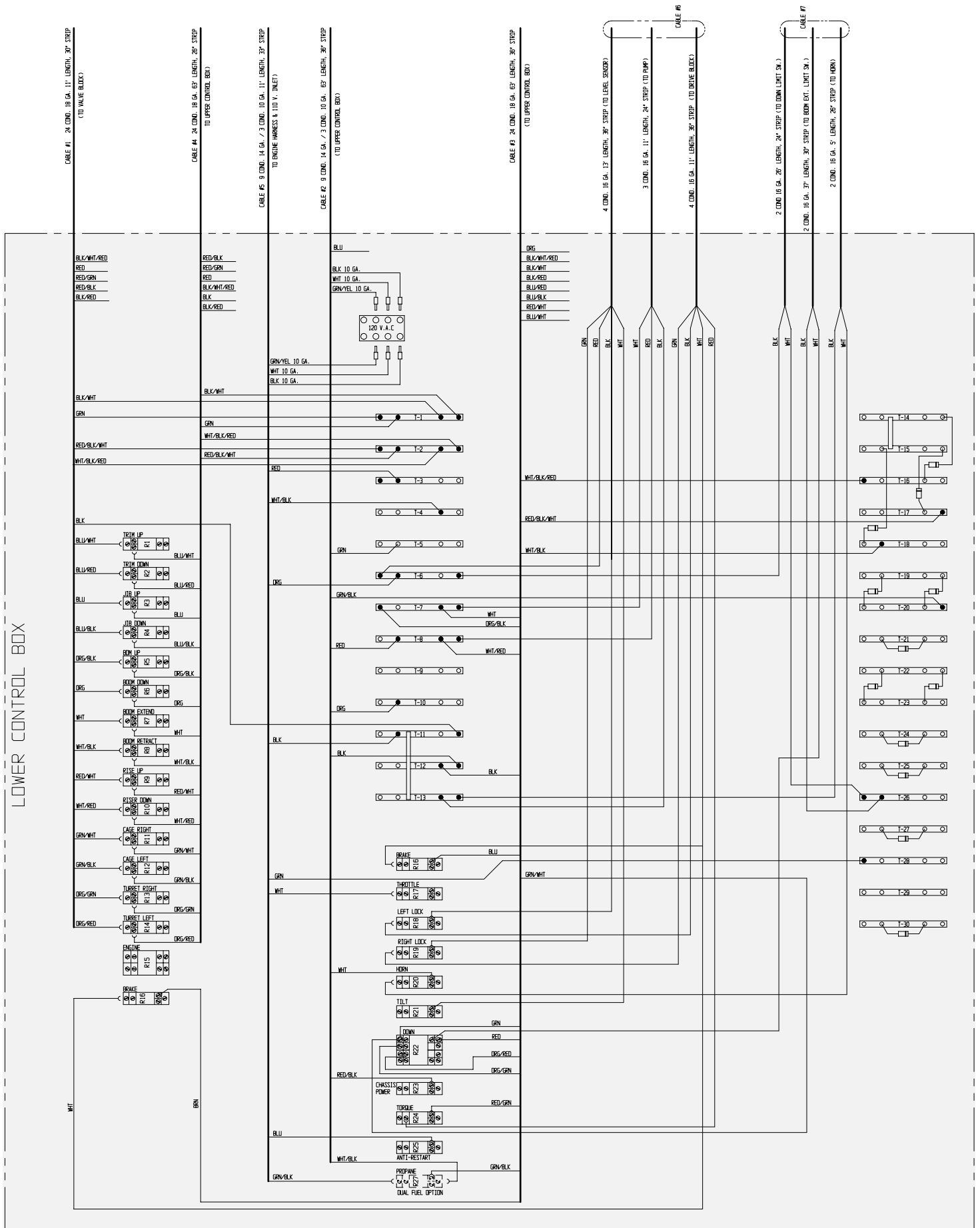
068311-010

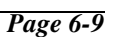
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068314-010	BASIC ASSEMBLY	1
2	068339-007	CONTROLLER INSTALLATION	1
3	068335-004	LABEL KIT/INSTALLATION	1
4	068336-005	HOSE KIT/INSTALLATION	1
6	029945-014	LEVEL SENSOR	1
9	060540-002	DOCUMENTATION KIT	1
10	068344-000	SERVICE MANUAL	1
11	010076-000	MANUAL CASE	1
12	011248-004	NUT - HEX ESNA 1/4-20UNC	4
13	011252-008	SCREW HHC 1/4-20 X 1	4
14	011240-004	WASHER - 1/4 FLAT	4
15	068342-001	USER MANUAL - DOM I/C	1
16	060565-000	ANSI MANUAL	1
17	065368-000	TACK	4

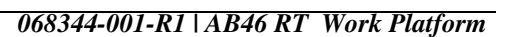
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1000	110100-000	PRODUCT SPECIFICATION SHEET	REF
1001	068341-032	ELECTRICAL SCHEMATIC	REF
1002	068340-005	HYDRAULIC SCHEMATIC	REF
213	068814-000	TERMINAL, PIN	6
214	029610-006	TERMINAL, FORK 18-16 #6	23
301	029601-005	TERMINAL, RING 18-22 GA. #10	22
302	029931-003	TERMINAL, FEM. PUSH-ON 16-14	12
303	014914-001	TERMINAL, MALE PUSH-ON 18-22 .25	3
304	029931-001	TERMINAL, FEM. PUSH-ON 18-22 .25	1
401	029440-099	WIRE, 3 COND 12 GA. SO.	2 FT
402	029490-099	WIRE, 2 COND. 16 GA. SO.	8 FT
403	029496-099	WIRE, 2 COND. 16 GA.	2 FT



Drawing # 1 of 4



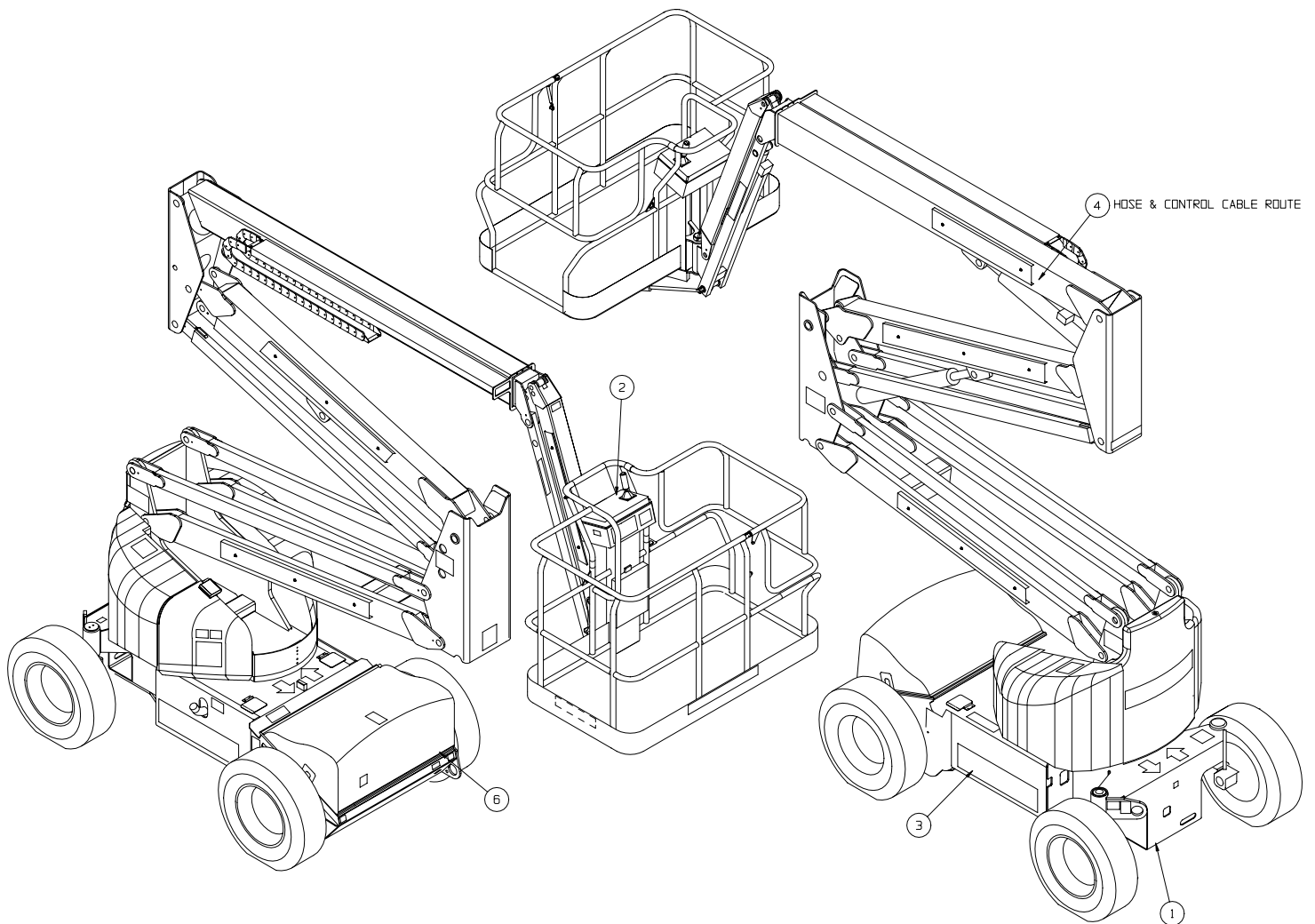




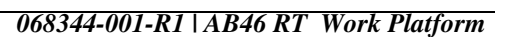
Final Assembly, JD Diesel

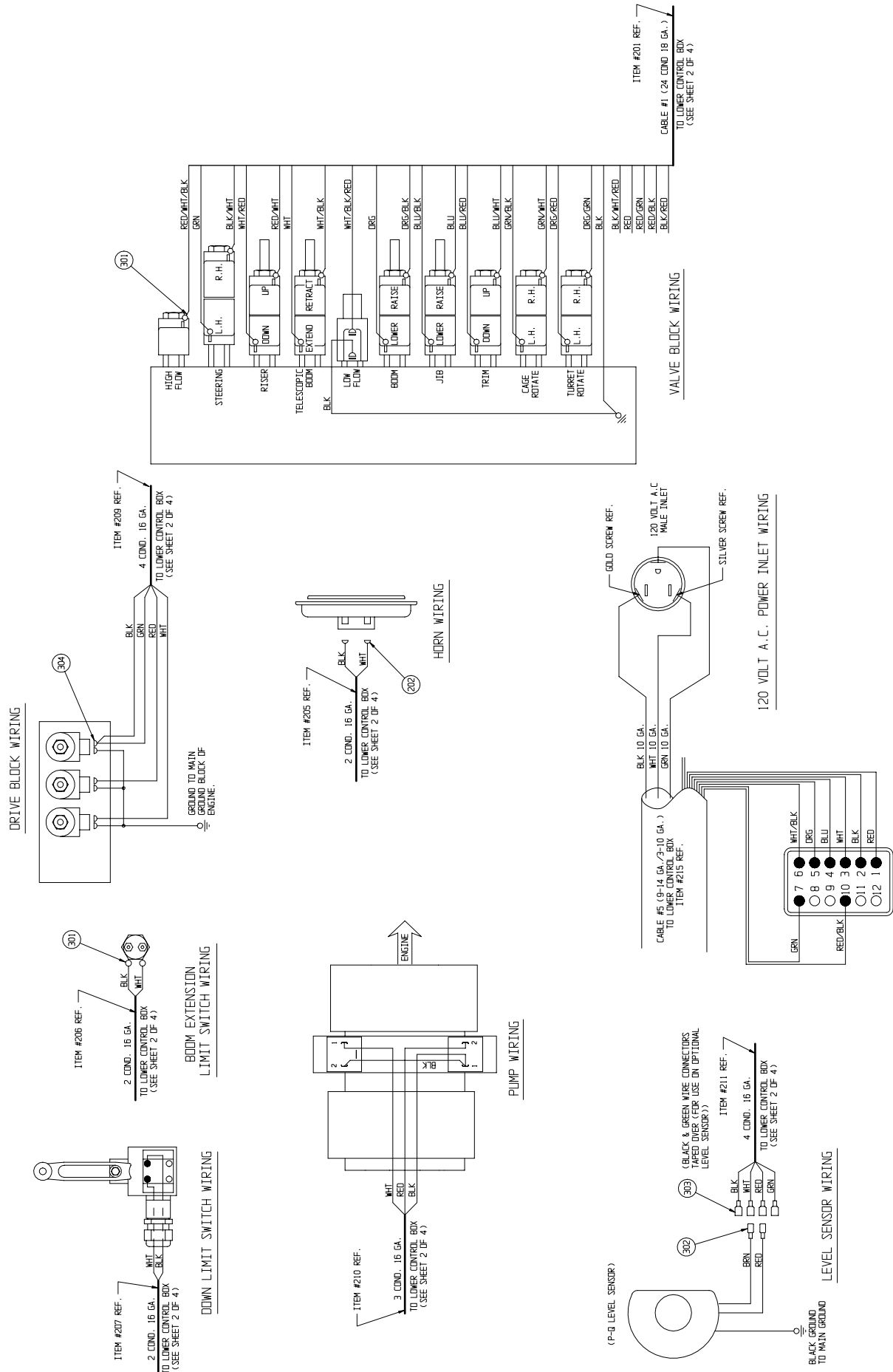
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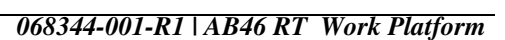
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068315-000	BASIC ASSEMBLY	1	210	029447-099	WIRE, 3 COND. 16 GA.	11 FT
2	068339-008	CONTROLLER INSTALLATION	1	211	029498-099	WIRE, 4 COND. 16 GA.	13 FT
3	068335-005	LABEL KIT/INSTALLATION	1	212	029433-099	CABLE, 24 COND. 18 GA.	63 FT
4	068336-005	HOSE KIT/INSTALLATION	1	214	029434-099	CABLE, 3-10 GA. / 9-14 GA.	63 FT
6	029945-014	LEVEL SENSOR	1	215	029434-099	CABLE, 3-10 GA. / 9-14 GA.	63 FT
9	060540-002	DOCUMENTATION KIT	1	216	029433-099	CABLE, 24 COND. 18 GA.	63 FT
10	068344-000	SERVICE MANUAL	1	217	029433-099	CABLE, 24 COND. 18 GA.	11 FT
1000	110100-000	PRODUCT SPECIFICATION SHEET	REF	301	029601-005	TERM, RING 18-22 GA. #10	22
1001	068341-030	ELECTRICAL SCHEMATIC	REF	302	029931-003	TERM, FEM. PUSH-ON 16-14	12
1002	068340-005	HYDRAULIC SCHEMATIC	REF	303	014914-001	TERM, MALE PUSH-ON 18-22 .25	3
201	029610-006	TERM, FORK 18-14 GA. #6	65	304	029931-001	TERM, FEM. PUSH-ON 18-22 .25	1
202	068814-000	TERM, PIN	12	401	029440-099	WIRE, 3 COND. 12 GA. SO.	2 FT
205	029496-099	WIRE, 2 COND. 16 GA.	5 FT	402	029490-099	WIRE, 2 COND. 16 GA. SO.	8 FT
206	029496-099	WIRE, 2 COND. 16 GA.	37 FT	403	029496-099	WIRE, 2 COND. 16 GA.	2 FT
207	029496-099	WIRE, 2 COND. 16 GA.	24 FT				
209	029498-099	WIRE, 4 COND. 16 GA.	11 FT				



Drawing # 1 of 4



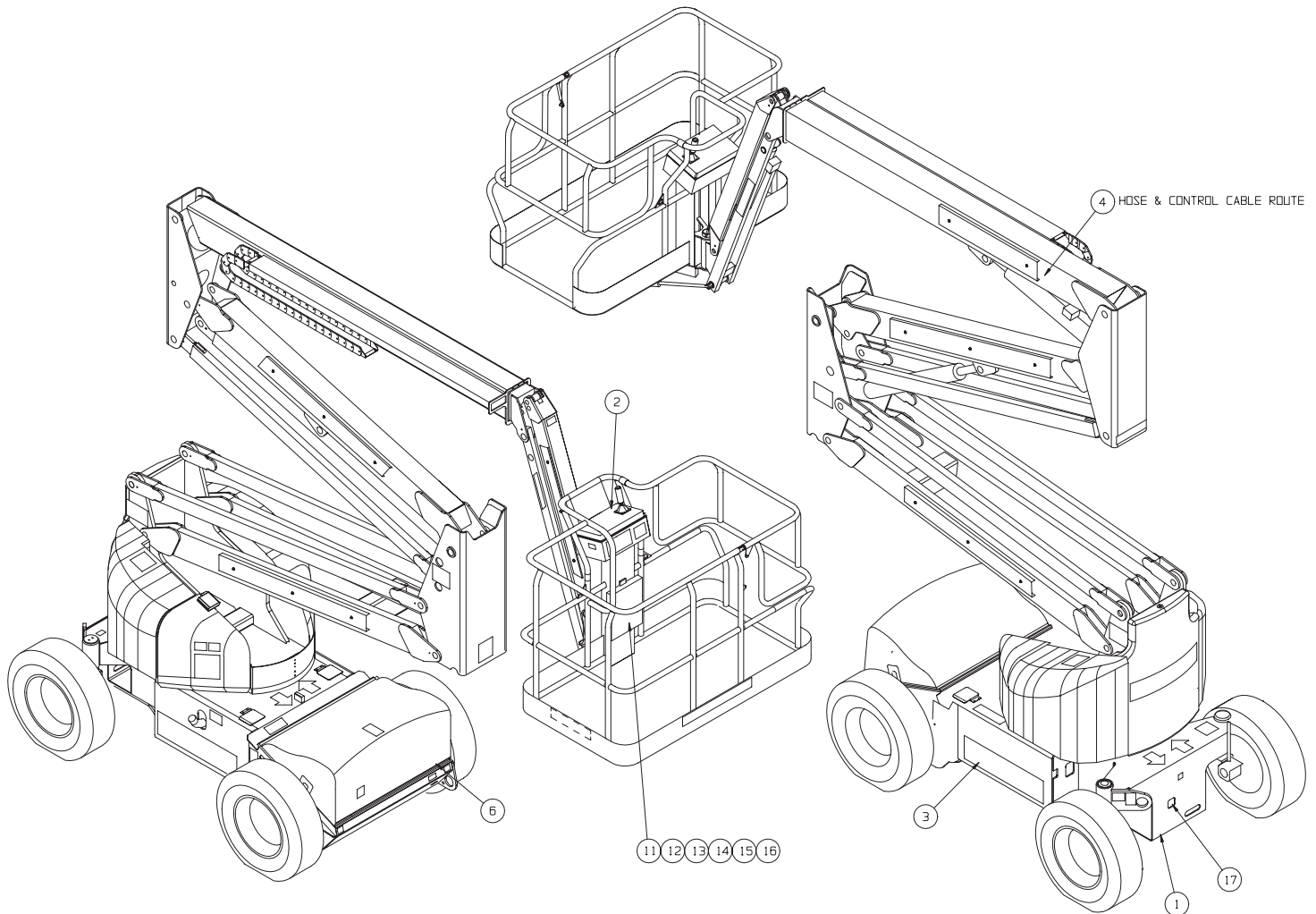




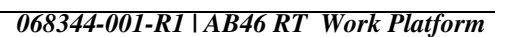
Final Assembly, Kubota Diesel

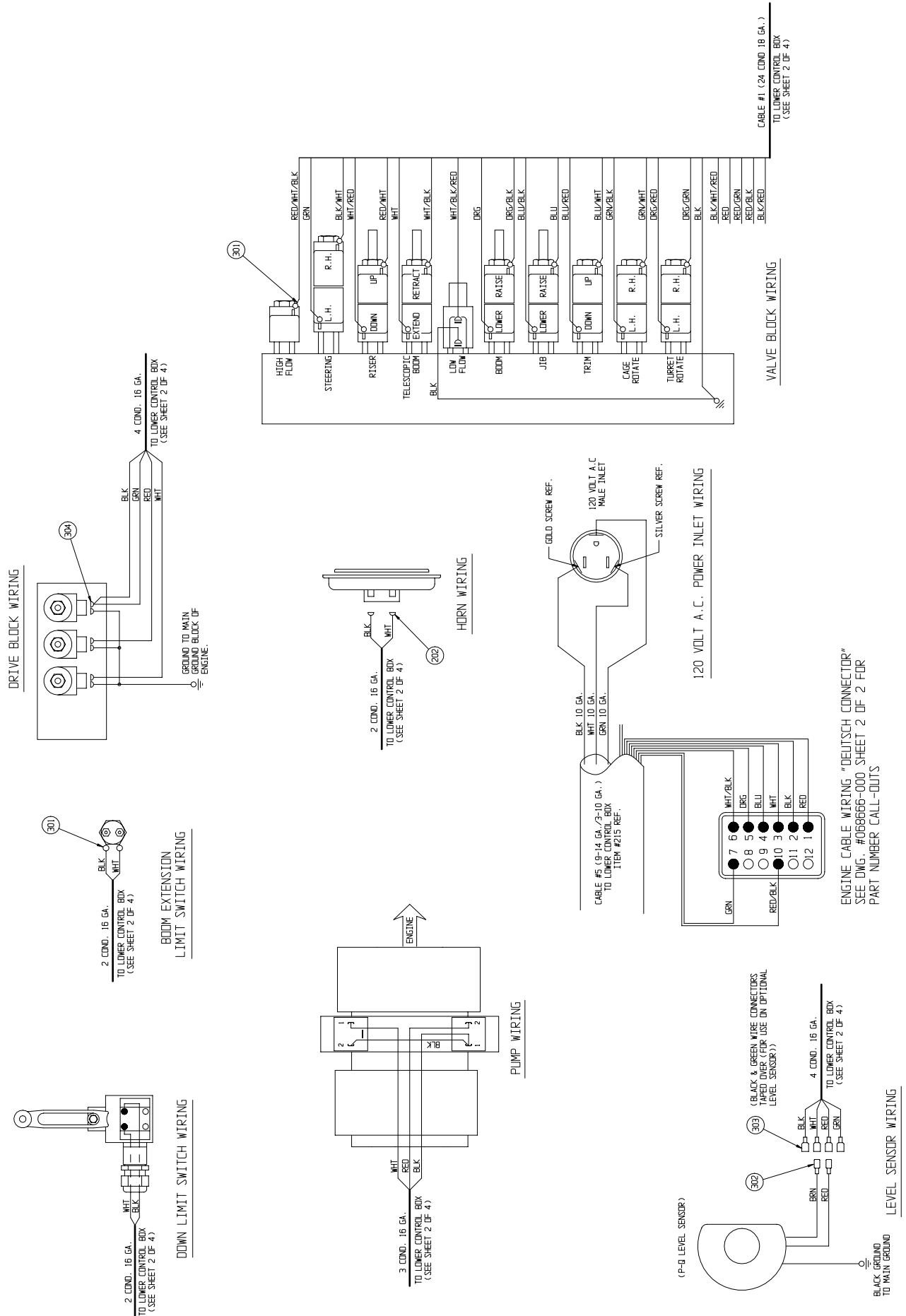
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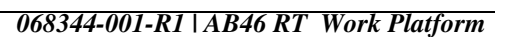
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068315-010	BASIC ASSEMBLY	1	1000	110100-000	PRODUCT SPECIFICATION SHEET	REF
2	068339-008	CONTROLLER INSTALLATION	1	1001	068341-033	ELECTRICAL SCHEMATIC	REF
3	068335-005	LABEL KIT/INSTALLATION	1	1002	068340-005	HYDRAULIC SCHEMATIC	REF
4	068336-005	HOSE KIT/INSTALLATION	1	201	029610-006	TERM, FORK 18-14 GA. #6	22
6	029945-014	LEVEL SENSOR	1	202	068814-000	TERM, PIN	6
9	060540-002	DOCUMENTATION KIT	1	203	068698-001	TERMINAL BLOCK	1
10	068344-000	SERVICE MANUAL	1	301	029601-005	TERM, RING 18-22 GA. #10	22
11	010076-000	MANUAL CASE	1	302	029931-003	TERM, FEM. PUSH-ON 16-14	12
12	011248-004	NUT - HEX ESNA 1/4-20UNC	4	303	014914-001	TERM, MALE PUSH-ON 18-22 .25	3
13	011252-008	SCREW HHC 1/4-20 X 1	4	304	029931-001	TERM, FEM. PUSH-ON 18-22 .25	1
14	011240-004	WASHER - 1/4 FLAT	4	401	029440-099	WIRE, 3 COND. 12 GA. SO.	2 FT
15	068342-003	USER MANUAL - DOM RT	1	402	029490-099	WIRE, 2 COND. 16 GA. SO.	8 FT
16	060565-000	ANSI MANUAL	1	403	029496-099	WIRE, 2 COND. 16 GA.	2 FT
17	065368-000	TACK	4				



Drawing # 1 of 4







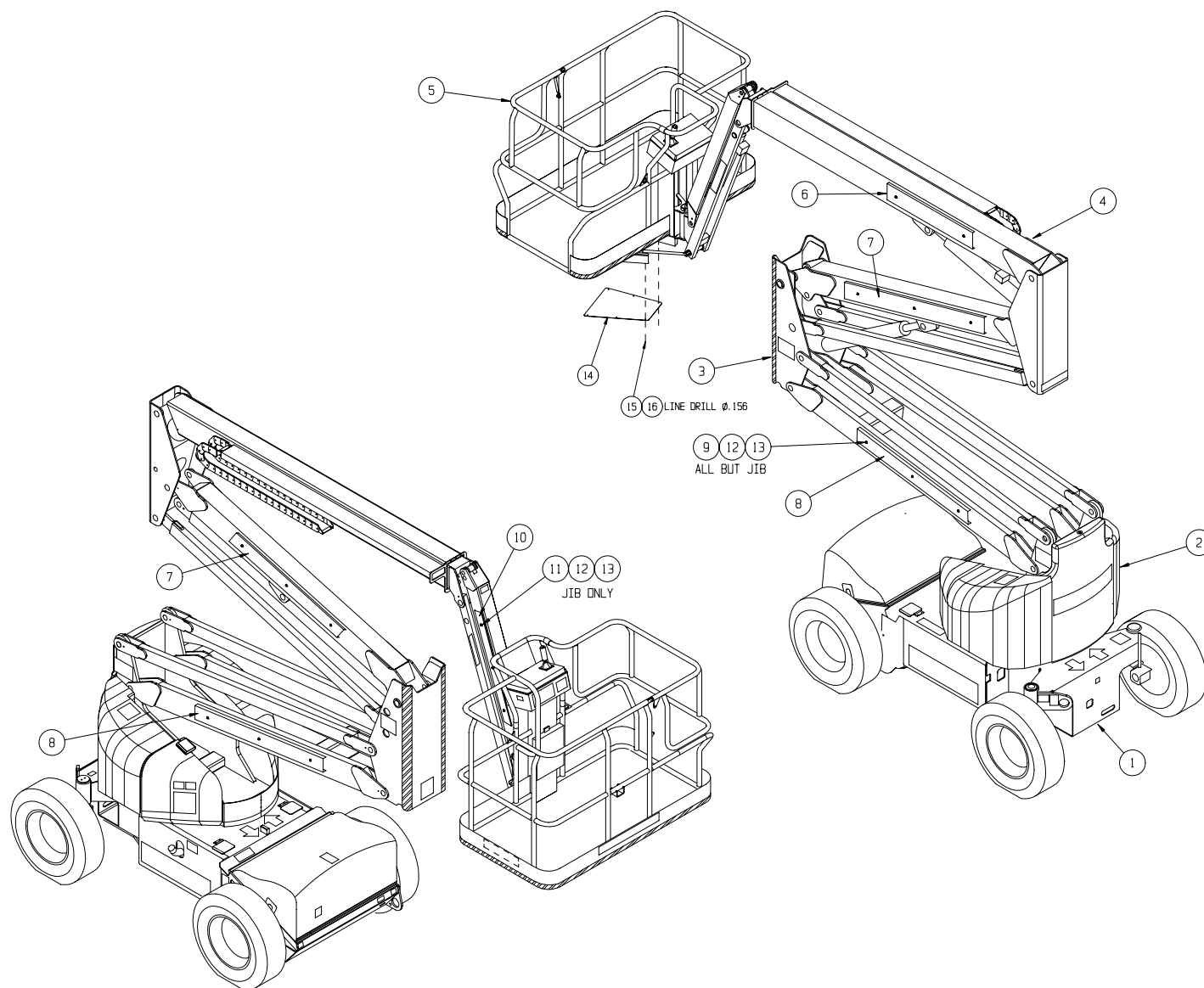
Basic Assembly, Dual Fuel

068314-000 | Ford |

068314-010 | Nissan |

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068316-013	CHASSIS ASSY. AB46-FORD	1
	068316-015	CHASSIS ASSY. AB46-NISSAN	
2	068330-004	TURRET ASSY-GAS	1
3	068323-000	LOWER LINKAGE ASSY	1
4	068322-000	UPPER LINKAGE ASSY	1
5	068325-001	CAGE "B" ASSY	1
6	068703-000	HOSE GUARD	1
7	068704-000	HOSE GUARD (58")	2
8	068705-000	HOSE GUARD (68")	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
9	068706-000	HOSE CLAMP	14
10	068731-000	HOSE GUARD-JIB	1
11	068732-000	HOSE CLAMP-JIB	3
12	011248-004	NUT HEX ESNA 1/4-20 UNC	17
13	011240-004	WASHER 1/4 STD FLAT	17
14	068977-000	CAGE CYL. COVER	1
15	026526-004	SCR, SELF-TAPPING #10 X 1/2"LG.	6
16	011237-003	LOCKWASHER, #10 STAR	6



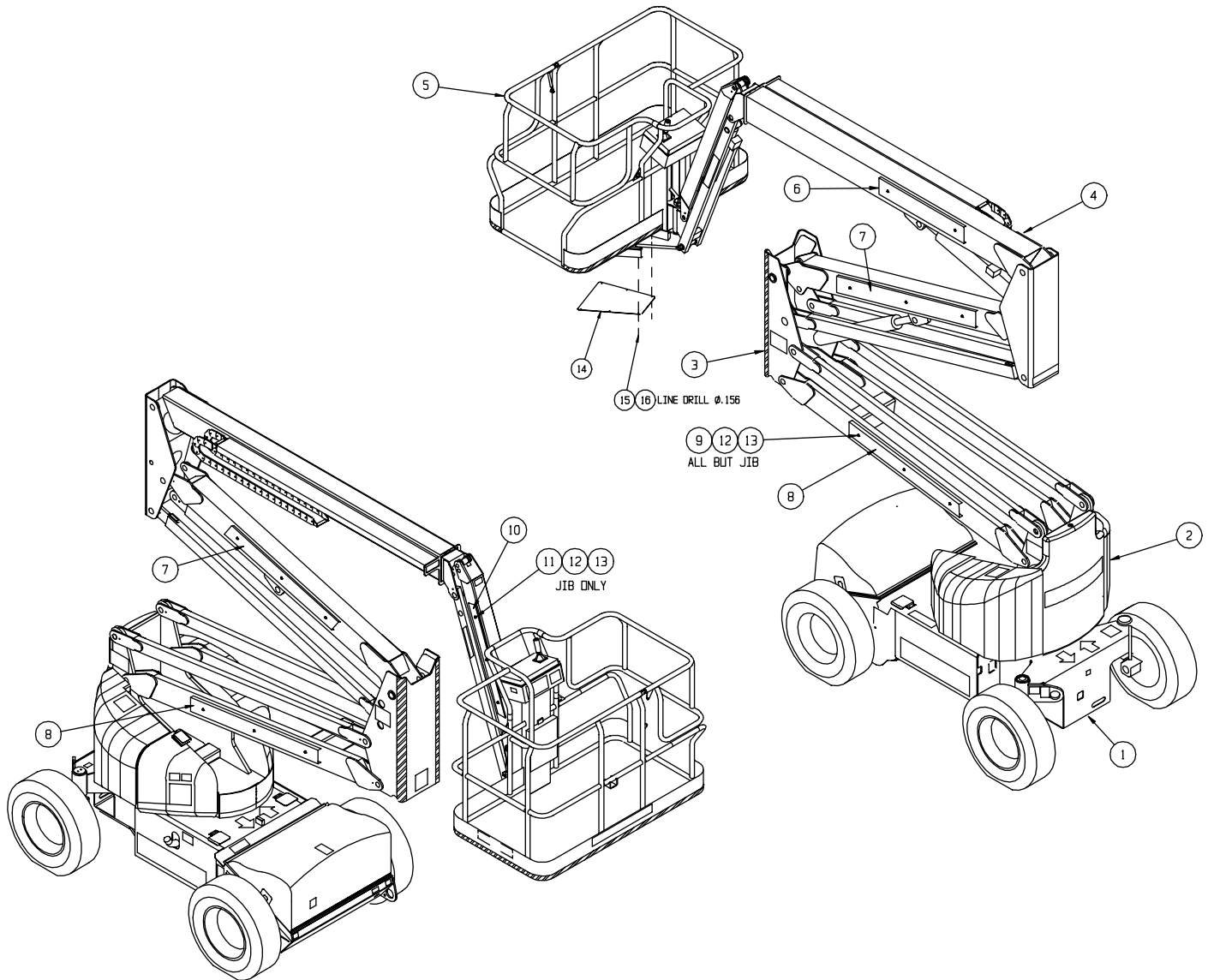
Basic Assembly, Diesel

068315-000 | JD |

068015-010 | Kubota |

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068316-014	CHASSIS ASSY. AB46RT, JOHN DEERE	1
	068316-016	CHASSIS ASSY. AB46RT, KUBOTA	
2	068330-005	TURRET ASSY-DSL	1
3	068323-000	LOWER LINKAGE ASSY	1
4	068322-000	UPPER LINKAGE ASSY	1
5	068325-001	CAGE "B" ASSY	1
6	068703-000	HOSE GUARD	1
7	068704-000	HOSE GUARD (58")	2
8	068705-000	HOSE GUARD (68")	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
9	068706-000	HOSE CLAMP	14
10	068731-000	HOSE GUARD-JIB	1
11	068732-000	HOSE CLAMP-JIB	3
12	011248-004	NUT HEX ESNA 1/4-20 UNC	17
13	011240-004	WASHER 1/4 STD FLAT	17
14	068977-000	CAGE CYL. COVER	1
15	026526-004	SCR, SELF-TAPPING #10 X 1/2"LG.	6
16	011237-003	LOCKWASHER, #10 STAR	6



Chassis Assembly, Ford Gas

068316-010

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068870-000	CHASSIS WELDMENT R/T	1
2	011256-012	SCRW HHC 1/2-13UNC X 1 1/2	2
3	011239-008	WASHER, FLAT ASTM A325 1/2 Ø	48
4	011248-008	LOCKNUT, HEX ESNA 1/2-13UNC	12
5	068839-002	STEERING YOKE, L/H	1
6	068839-001	STEERING YOKE, R/H	1
7	068690-000	HYD. MOTOR, SUNDSTRAND	2
*	068690-010	SEAL KIT	
8	068847-000	AXLE RETAINER	1
9	068905-000	STEERING PIN,	2
10	068456-001	CYLINDER, STEERING	1
*	068456-011	SEAL KIT	1
11	063559-001	BOLT SHLDR 1/2" DIA X 1 3/4" LG	2
14	011248-006	LOCKNUT, HEX ESNA 3/8-16UNC	2
15	068838-101	STEERING PIVOT WELDMENT	2
16	011256-018	SCRW, HHC GR5 1/2-13UNC X 2 1/4	4
17	062642-033	BRG. GARLOCK #20DU16	4
18	068380-000	STEERING PIN, SHORT	2
19	068835-001	FRONT AXLE WELDMENT	1
20	011240-008	WASHER, FLAT STD. 1/2"	4
21	011256-030	SCRW. HHC, GR 5 1/2-13UNC X 3 3/4	2
22	011257-014	SCRW. HHC, GR 5 5/8-11UNC X 1 3/4	12
23	068886-000	CYLINDER,	2
*	068886-010	SEAL KIT	1
24	068576-001	BUSHING, GARLOCK #GF4852-40	2
25	068885-000	FITTING, SWIVEL	4
26	068327-004	TIRE/WHEEL ASSY. R.H.	2
27	068327-005	TIRE/WHEEL ASSY. L.H.	2
28	011257-012	SCRW. HHC, GR 5 5/8-11UNC X 1 1/2	12
29	068869-001	THRUST RING (UHMW)	2
30	068869-002	THRUST RING	4
31	011297-010	WASHER, BELLVILLE Ø 5/8	18
32	011469-005	LUG NUT, 9/16-18NF 90	36
33	011238-008	WASHER, SPLIT LOCK 1/2"	6
34	011737-016	ROLLPIN 1/4 DIA. X 2" LG.	4
35	068959-003	WASHER, SQ. STL. Ø1/2" 2 X 2 X 1/4	2
36	011225-008	WASHER, FENDER 1/2"	2
37	062642-023	BUSHING, GARLOCK #20DU20	4
38	011941-011	FITTING, STR. ADAPTER 8MB-10MJ	4
39	011934-010	FITTING, 90° 10MB-8MJ	2
40	012004-004	PLUG, #4 S.A.E.	4
41	064297-001	P.O. CHECK VALVE	2
42	011934-001	FITTING, 90° 4MB-4MJ	6
43	011941-001	FITTING, STR. ADAPTER 4MB-4MJ	2
44	011932-001	FITTING, 45° 4FJX-4MJ	2
45	068575-000	HYD. MOTOR, WHITE	1
46	068571-000	DRIVE, WORM GEAR	1
47	014576-026	SCRW. GR 8 HHC. 5/8-11UNF X 3 1/4	18
48	011941-038	FITTING, STR. ADAPTER 10MB-4MJ	2
49	068884-000	PLANETARY DRIVE, FAIRFIELD	4
50	068569-001	BRAKE, AUSCO #75620	2
*	068569-010	SEAL KIT	1
51	068904-000	DRAW LATCH	2
52	068898-002	LYNCH PIN, (PIVOT POINT #HANG-2)	4
53	068898-001	LYNCH PIN, (PIVOT POINT #HANG-1)	2
54	068878-000	COWLING PLATE	2
55	068882-000	HYD. MOTOR,	2
*	068882-010	SEAL KIT	

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
56	068916-000	ENGINE COWLING	1
57	011934-007	FITTING, 90° 8MB-6MJ	4
58	068902-000	STEERING LINK	2
59	011935-001	FITTING, 45° 4MB-4MJ	2
60	068906-000	CYLINDER PIN	4
61	063783-002	LANYARD ASSY. X 5-1/2	2
62	011239-010	WASHER, FLAT ASTM A325 5/8 DIA.	24
63	011934-004	FITTING, 90° 6MB-6MJ	2
64	068899-001	BUSHING, GARLOCK GM3236-24	4
65	011252-004	SCREW, HHC 1/4-20 X 1/2	2
66	011246-004	HEX NUT 1/4-20 ESNA THIN	2
67	068647-000	FLANGE KIT, 12SFO	4
68	109060-000	PAD, U.H.M.W.	2
69	011257-042	SCRW. HHC, GR 5 5/8-11 X 5 1/4	1
70	011248-010	NUT, HEX 5/8-11 ESNA	1
71	013888-063	"O" RING	2
72	011256-034	SCRW, HHC, GR5 1/2-13UNC X 4 1/4	4
73	013965-006	SCRW, HHC 10-24 X 3/4	8
74	011240-003	WASHER FLAT STD #10	8
75	011248-003	NUT, 10-24 ESNA	8
76	011256-010	SCRW HHC, 1/2-13UNC X 1 1/4	4
77	068680-007	FITTING, 90° ELBOW	2
78	011266-220	SCREW, HHC GR8 1/2-20 UNF X 2-1/2	2
79	011248-004	NUT, HEX 1/4-20 ESNA	4
80	011252-016	SCRW HHC GR5 1/4-20UNC X 1	4
81	068386-001	DOOR WELDMENT RH	1
82	068386-000	DOOR WELDMENT LH	1
84	011249-108	NUT, 1/2-20 UNF GR8 ESNA	12
85	109058-000	KING PIN, UPPER	2
86	109059-000	KING PIN, LOWER	2
87	011256-028	SCREW, HHC. 1/2-13 UNC X 3-1/2	4
88	100385-099	HOSE GUARD NYLON	A/R

* Not shown

Drawing #2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
201	068893-000	RADIATOR HOSE, BOTTOM	1
203	068894-000	RADIATOR HOSE, TOP	1
205	069205-000	HYDRAULIC TANK ASSY. R/T (28 GAL)	1
206	069211-000	BRACKET, OVERFLOW TANK	1
207	068774-000	VIBRATION ISOLATOR	2
208	068890-000	INLET HOSE, AIR FILTER	1
209	068915-001	MUFFLER-RT	1
210	068953-000	VALVE BLOCK ASSY. R/T DRIVE	1
211	068903-000	AIR CLEANER	1
212	068903-001	RAIN CAP, AIR CLEANER	1
213	068903-002	CLAMP, AIR CLEANER	1
214	068866-000	ACCESS COVER	1
216	109052-000	FUEL TANK ASSY	1
217	011240-006	WASHER, FLAT STD. 3/8	14
218	011248-006	LOCKNUT, HEX. 3/8-16UNC ESNA	16
219	068871-001	ENGINE ASSY. R/T EFI GAS	1
221	011253-008	SCRW, HHC. 5/16-18UNC X 1	4
222	011248-005	LOCKNUT, HEX. 5/16-18UNC ESNA.	6
223	020541-018	HOSE CLAMP	2
224	020541-011	HOSE CLAMP	4
225	068941-000	HEAT SHIELD	1
226	068868-001	FAN SHROUD	1
227	068934-000	SHROUD SPACER	4
228	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	14
229	011254-010	SCRW, HHC. GR5 3/8-16UNC X 1-1/4	11
230	011253-022	SCRW, HHC. 5/16-18UNC X 2-3/4	2
231	062299-004	BATTERY, 12 VDC DRY	1
232	068960-000	EXHAUST FLANGE GASKET (GAS)	1
234	063946-020	SCR, HHC. M10-105 X 20MM LG.	2
236	064275-048	BATTERY CABLE, POSITIVE (48")	1
237	064275-034	BATTERY CABLE, NEGATIVE (34")	1
238	068887-000	RADIATOR, R/T	1
239	069229-000	RADIATOR SUPPORT BRKT WELDMENT	1
240	068549-000	HOLD DOWN BAR, BATTERY	1
241	012039-000	ROD, BATTERY HOLD DOWN	2
242	011240-005	WASHER, FLAT STD 5/16	8
243	011250-005	NUT, HEX 5/16-18UNC	4
244	068863-000	GRILL, RADIATOR	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
245	068966-000	OVERFLOW BOTTLE	1
246	REF.	TUBE (SUPPLIED WITH ITEM 245)	1
247	011248-004	LOCKNUT, 1/4-20UNC. ESNA	12
248	011252-008	SCR, HHC. 1/4-20UNC X 1	2
249	068867-000	DRAIN COVER	2
250	068865-000	OUTLET PLATE	1
251	014252-004	NUTSERT 1/4-20 UNC	8
252	011238-004	LOCKWASHER 1/4 SPLIT	8
253	011715-004	SCREW RD HD #6-32 X 1/2	2
254	011248-047	LOCKNUT #6-32 HEX	2
255	029945-013	LEVEL SENSOR (EUR)	REF
256	029945-014	LEVEL SENSOR (DOM)	REF
257	020541-003	HOSE CLAMP #6	8
258	029961-000	INLET	1
259	029961-001	SEAL	1
260	011253-010	SCREW HHC 5/16-18 X 1-1/4	2
261	011252-004	SCREW HHC 1/4-20 X 1/2	4
262	011240-004	WASHER FLAT STD 1/4	10
263	011256-016	SCREW HHC 1/2-13 X 2	2
269	011252-024	SCREW, HHC 1/4-20 UNC X 3	2
270	011252-028	SCREW, HHC 1/4-20 UNC X 3-1/2	4
271	104478-001	CLAMP, HOSE	2
272	104478-000	CLAMP, HOSE	4
273	029480-099	WIRE, 10 GA RED	.8FT
274	029601-021	CONN. RING (12-10GA) Ø3/8	2
*275	109051-013	FILTER, LPG	1
*276	109051-012	FILTER, GAS	1
*277	109051-011	PUMP, GAS	1
*278	109051-038	FITTING, STR	1
*279	109051-039	FITTING, 90°	1
*280	109051-040	FITTING, STR BARBED	1
*281	109051-014	WIRE HARNESS, EFI GAS	1
282	067615-048	LPG HOSE ASSY, Ø5/16 X 26" LG	2
283	012733-099	HOSE, FUEL Ø5/16	3.8FT

* Items 275 - 281 included with EFI gas engine
#109051-000

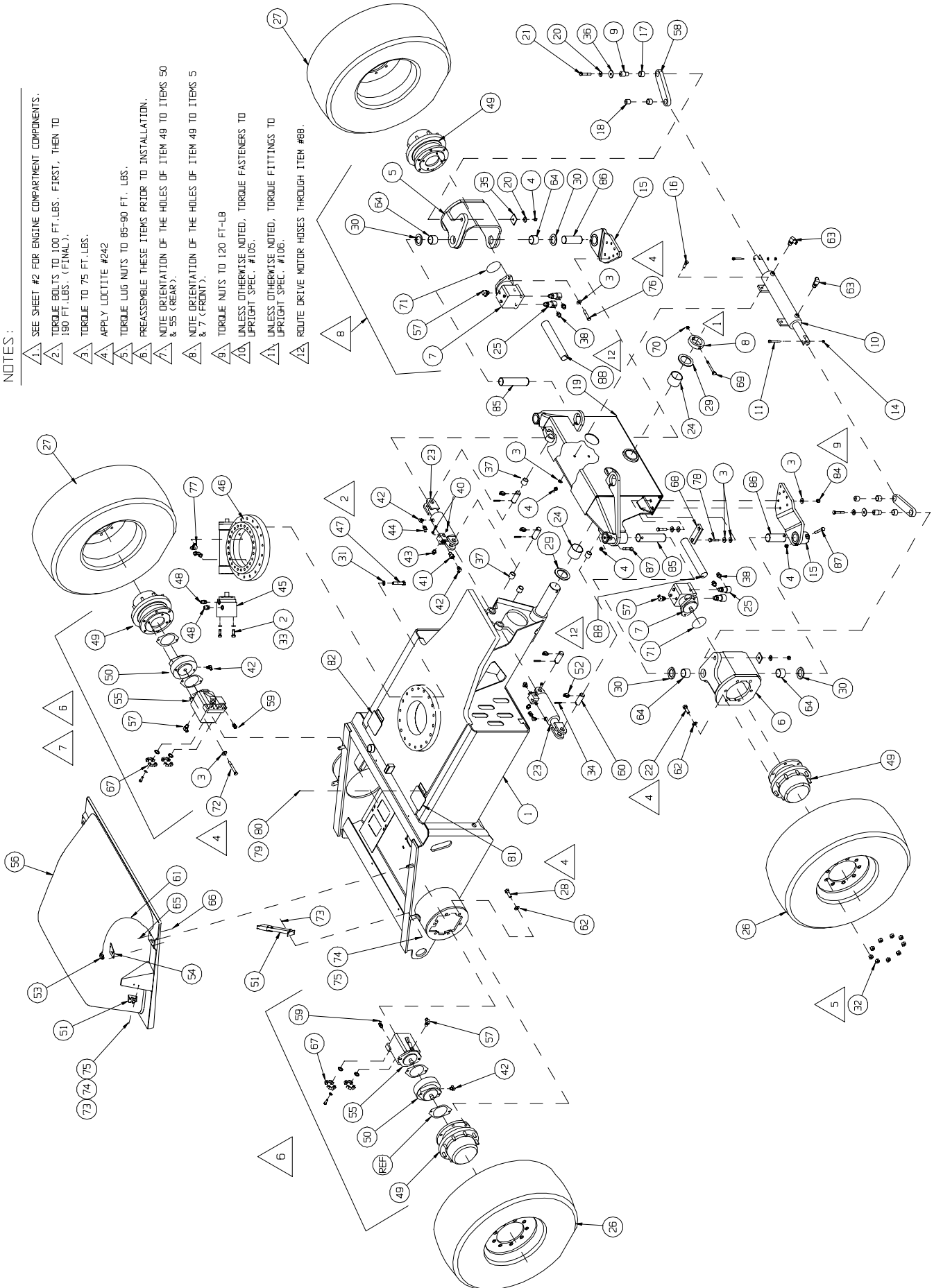
Drawing 3

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
301	014250-003	WELD STUD, 3/8-16 UNC X 1	4
302	027934-003	TANK, PROPANE	1
303	067615-070	ADAPTER, LPG TANK (LP-20)	1
304	067615-074	FITTING, RUN TEE 1/4" NPT BRASS (LP-24)	1
305	068990-023	FITTING, FLARE 3/8 TUBE-1/4NPT45° EL (LP-33)	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
306	067615-075	VALVE, RELIEF (LP-25)	1
307	068296-010	MOUNTING BRACKET, PROPANE TANK	1
308	011248-006	LOCKNUT, 3/8-16 UNC ESNA	4
309	011240-006	WASHER, 3/8" FLAT	4

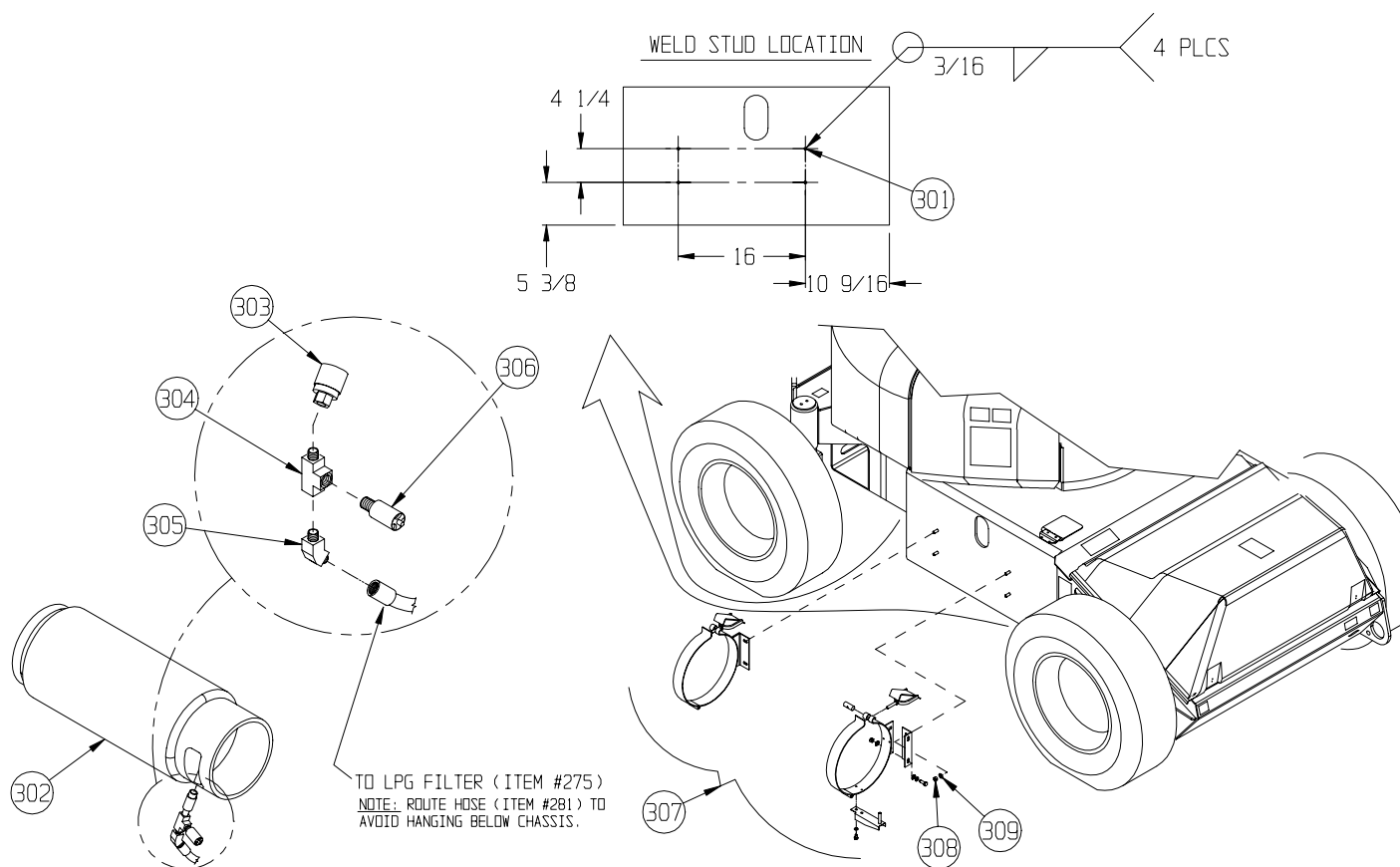
NOTES:

1. SEE SHEET #2 FOR ENGINE COMPARTMENT COMPONENTS.
2. TORQUE BOLTS TO 100 FT.-LBS. FIRST, THEN TO 150 FT.-LBS. (FINAL).
3. TORQUE TO 75 FT.-LBS.
4. APPLY LOCTITE #242.
5. TORQUE LUG NUTS TO 85-90 FT. LBS.
6. PREASSEMBLE THESE ITEMS PRIOR TO INSTALLATION.
7. NOTE ORIENTATION OF THE HOLES OF ITEM 49 TO ITEMS 50 & 55 (REAR).
8. NOTE ORIENTATION OF THE HOLES OF ITEM 49 TO ITEMS 5 & 7 (FRONT).
9. TORQUE NUTS TO 120 FT.-LB
10. UNLESS OTHERWISE NOTED, TORQUE FASTENERS TO UPRIGHT SPEC. #105.
11. UNLESS OTHERWISE NOTED, TORQUE FITTINGS TO UPRIGHT SPEC. #106.
12. ROUTE DRIVE MOTOR HOSES THROUGH ITEM #88.





1. CONNECT ENGINE ASSY. GROUND WIRE TO BATTERY GROUND.
2. LOCKWASHER GOES UNDER SCREW HEAD. AND LOCITITE THREADS TO ITEM #265. (SCREW HEAD TOWARDS BATTERY).
3. UNLESS OTHERWISE NOTED, TORQUE FASTENERS TO UPRIGHT SPEC. #105.
4. UNLESS OTHERWISE NOTED, TORQUE FITTINGS TO UPRIGHT SPEC. #106.



Chassis Assembly, Ford Dual Fuel

068316-013

Drawing #1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068870-000	CHASSIS WELDMENT R/T	1
2	109114-000	FRONT AXLE ASSEMBLY	1
3	068327-004	TIRE/WHEEL ASSY. R.H.	2
4	068327-005	TIRE/WHEEL ASSY. L.H.	2
5	109117-000	SLEW DRIVE ASSEMBLY	1
6	109087-000	HUB - PLANETARY	2
7	100388-000	GASKET	4
8	109113-000	BRAKE ASSEMBLY	2
9	109112-000	MOTOR ASSEMBLY-LEFT REAR	1
10	011239-008	WASHER, FLAT ASTM A325 1/2"	4
11	011256-034	HHCS 1/2-13 X 4-1/4 GRADE 5	4
12	011297-010	WASHER, BELLVILLE 5/8	18
13	011291-032	HHCS 5/8-11 X 4, GRADE 8	18
14	109093-000	AXLE LOCK CYLINDER ASSY	2
15	068869-001	THRUST RING (UHMW)	2
16	068847-000	AXLE RETAINER	1
17	011257-042	HHCS 5/8-11 X 5-1/4, GRADE 5	1
18	011248-010	NUT, HEX 5/8-11 ESNA	1
19	068906-000	CYLINDER PIN	4
20	068898-002	LYNCH PIN	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
21	011737-016	ROLLPIN 1/4 DIA. X 2" LG.	4
22	011469-005	LUG NUT, 9/16-18NF 90 GRADE 5	36
23	011257-012	HHCS, 5/8-11 X 1 1/2, GRADE 5	12
24	011239-010	WASHER, FLAT ASTM A325 5/8"	12
25	068916-000	ENGINE COWLING	1
26	063783-002	LANYARD ASSY. X 5-1/2	2
27	011252-004	HHCS 1/4-20 X 1/2, GRADE 5	2
28	011246-004	HEX NUT 1/4-20 ESNA THIN	2
29	068878-000	COWLING PLATE	2
30	068898-001	LYNCH PIN	2
31	068904-000	DRAW LATCH	2
32	013965-006	HHCS 10-24 X 3/4, GRADE 5	8
33	011240-003	WASHER FLAT STD #10	8
34	011248-003	NUT, 10-24 ESNA	8
35	109111-000	MOTOR ASSEMBLY-RIGHT REAR	1
36	062642-023	BUSHING	2
37	100385-099	HOSE GUARD, NYLON	A/R

* Not shown

Drawing #2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
201	068893-000	RADIATOR HOSE, BOTTOM	1
203	068894-000	RADIATOR HOSE, TOP	1
205	069205-000	HYDRAULIC TANK ASSY. R/T (28 GAL)	1
206	068909-000	BRACKET, OVERFLOW TANK	1
207	068774-000	VIBRATION ISOLATOR	2
208	068890-000	INLET HOSE, AIR FILTER	1
209	068915-001	MUFFLER-RT	1
210	109109-000	VALVE BLOCK ASSY. R/T DRIVE	1
211	068903-000	AIR CLEANER	1
212	068903-001	RAIN CAP, AIR CLEANER	1
213	068903-002	CLAMP, AIR CLEANER	1
214	068866-000	ACCESS COVER	1
216	109052-000	FUEL TANK ASSY	1
217	011240-006	WASHER, FLAT STD. 3/8	14
218	011248-006	LOCKNUT, HEX. 3/8-16UNC ESNA	16
219	068871-001	ENGINE ASSY. R/T EFI GAS	1
221	011253-008	SCRW, HHC. 5/16-18UNC X 1	4
222	011248-005	LOCKNUT, HEX. 5/16-18UNC ESNA.	6
223	020541-018	HOSE CLAMP	2
224	020541-011	HOSE CLAMP	4
225	068941-000	HEAT SHIELD	1
226	068868-001	FAN SHROUD	1
227	068934-000	SHROUD SPACER	4
228	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	14
229	011254-010	SCRW. HHC. GR5 3/8-16UNC X 1-1/4	11
230	011253-022	SCRW, HHC. 5/16-18UNC X 2-3/4	2
231	062299-002	BATTERY, 12 VDC	1
232	068960-000	EXHAUST FLANGE GASKET (GAS)	1
234	063946-020	SCR, HHC. M10-105 X 20MM LG.	2
236	064275-048	BATTERY CABLE, POSITIVE (48")	1
237	064275-034	BATTERY CABLE, NEGATIVE (34")	1
238	068887-000	RADIATOR, R/T	1
239	069229-000	RADIATOR SUPPORT BRKT WELDMENT	1
240	068549-000	HOLD DOWN BAR, BATTERY	1
241	012039-000	ROD, BATTERY HOLD DOWN	2
242	011240-005	WASHER, FLAT STD 5/16	8
243	011250-005	NUT, HEX 5/16-18UNC	4
244	068863-000	GRILL, RADIATOR	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
245	068966-000	OVERFLOW BOTTLE	1
246	REF.	TUBE (SUPPLIED WITH ITEM 245)	1
247	011248-004	LOCKNUT, 1/4-20UNC. ESNA	12
248	011252-008	SCR, HHC. 1/4-20UNC X 1	2
249	068867-000	DRAIN COVER	2
250	068865-000	OUTLET PLATE	1
251	014252-004	NUTSERT 1/4-20 UNC	8
252	011238-004	LOCKWASHER 1/4 SPLIT	8
253	011715-004	SCREW RD HD #6-32 X 1/2	2
254	011248-047	LOCKNUT #6-32 HEX	2
255	029945-013	LEVEL SENSOR (EUR)	REF
256	029945-014	LEVEL SENSOR (DOM)	REF
257	020541-003	HOSE CLAMP #6	8
258	029961-000	INLET	1
259	029961-001	SEAL	1
260	011253-010	SCREW HHC 5/16-18 X 1-1/4	2
261	011252-004	SCREW HHC 1/4-20 X 1/2	4
262	011240-004	WASHER FLAT STD 1/4	10
263	011256-016	SCREW HHC 1/2-13 X 2	2
269	011252-024	SCREW, HHC 1/4-20 UNC X 3	2
270	011252-028	SCREW, HHC 1/4-20 UNC X 3-1/2	4
271	104478-001	CLAMP, HOSE	2
272	104478-000	CLAMP, HOSE	4
273	029480-099	WIRE, 10 GA RED	.8FT
274	029601-021	CONN. RING (12-10GA) 3/8	2
**275	109051-013	FILTER, LPG	1
**276	109051-012	FILTER, GAS	1
**277	109051-011	PUMP, GAS	1
**278	109051-038	FITTING, STR	1
**279	109051-039	FITTING, 90	1
**280	109051-040	FITTING, STR BARBED	1
**281	109051-014	WIRE HARNESS, EFI GAS	1
282	067615-048	LPG HOSE ASSY, 5/16 X 26" LG	2
283	012733-099	HOSE, FUEL 5/16	A/R

* Not shown

** Items 275 - 281 included with EFI gas engine

Drawing #3

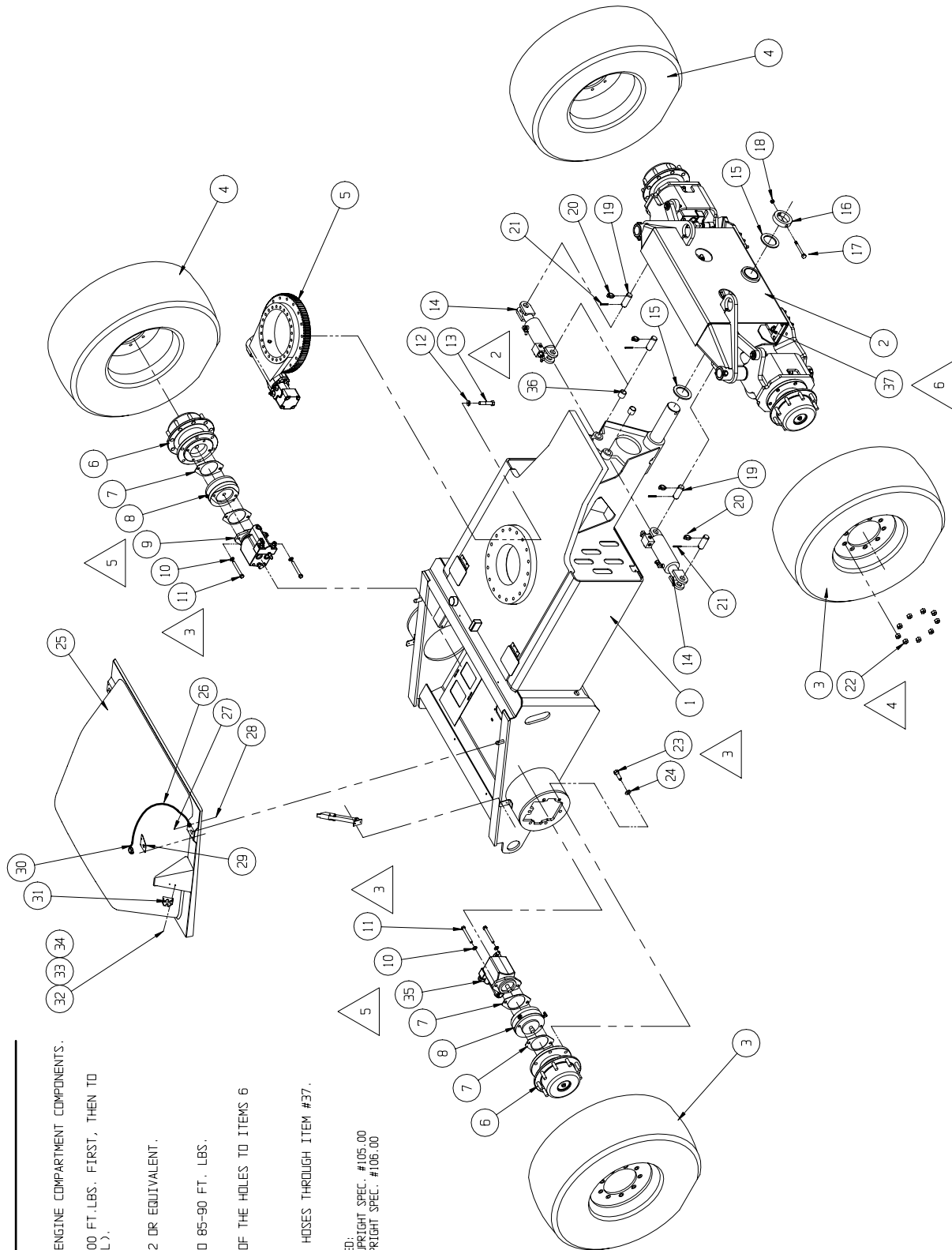
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
301	014250-003	WELD STUD, 3/8-16 UNC X 1	4
302	027934-003	TANK, PROPANE	1
303	067615-070	ADAPTER, LPG TANK (LP-20)	1
304	067615-074	FITTING, RUN TEE 1/4" NPT BRASS (LP-24)	1
305	068990-023	FITTING, FLARE 3/8 TUBE-1/4NPT45 EL (LP-33)	1
306	067615-075	VALVE, RELIEF (LP-25)	1

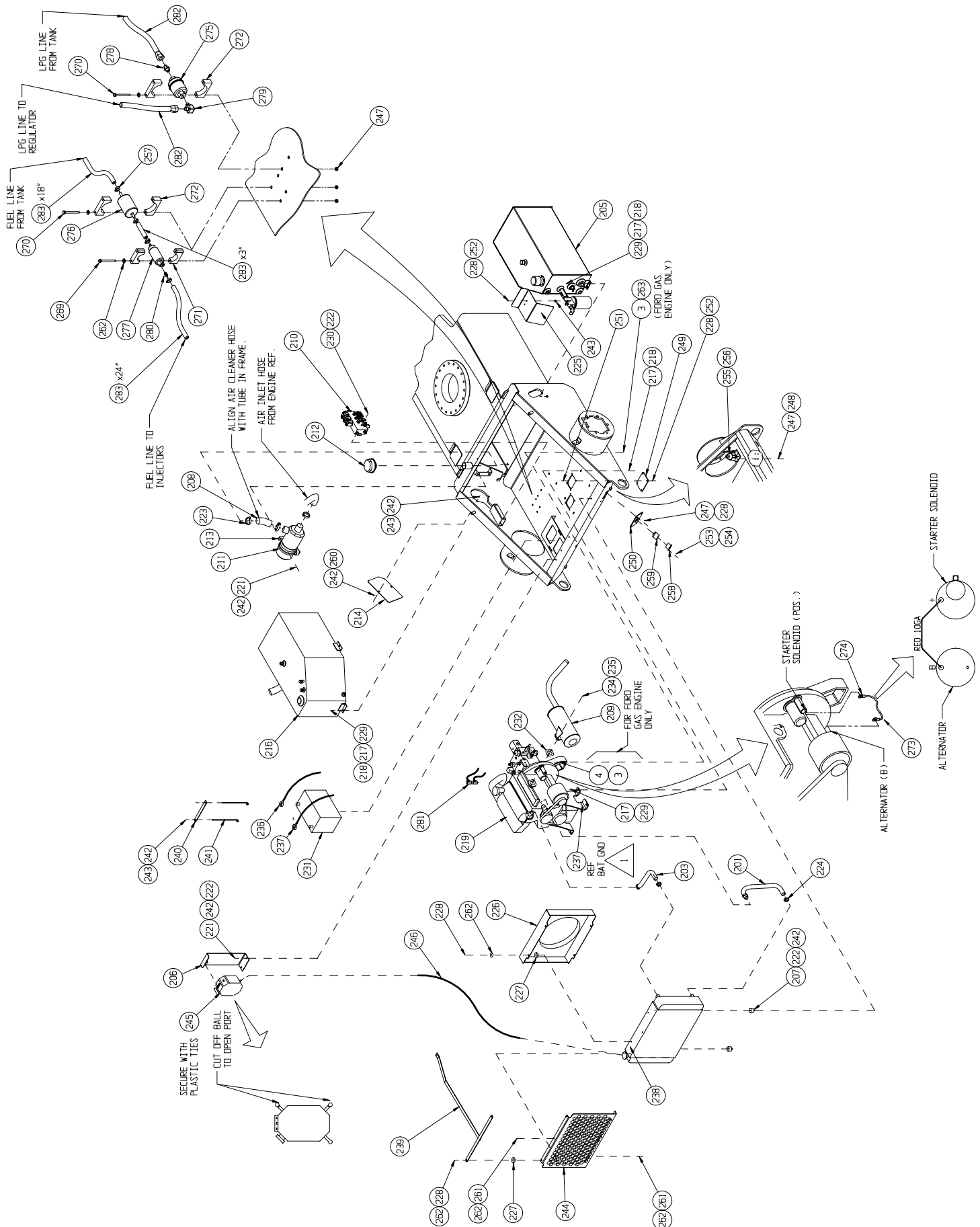
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
307	027823-000	MOUNTING BRACKET, PROPANE TANK	1
308	011248-006	LOCKNUT, 3/8-16 UNC ESNA	4
309	011240-006	WASHER, 3/8" FLAT	4

NOTES:

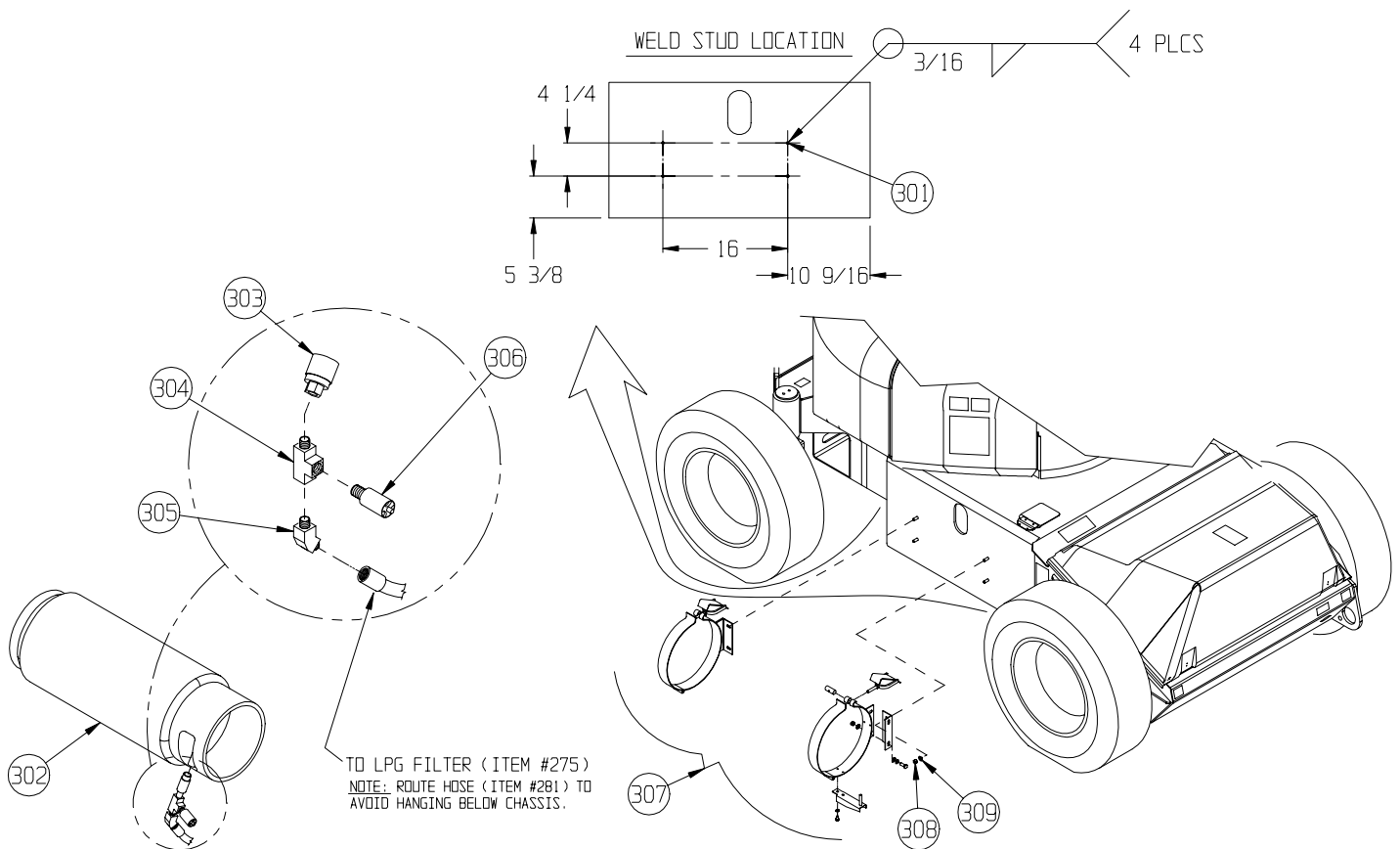
- 1 SEE SHEET #2 FOR ENGINE COMPARTMENT COMPONENTS.
 2 TORQUE BOLTS TO 100 FT.LBS. FIRST, THEN TO 190 FT.LBS. (FINAL).
 3 APPLY LOCTITE #242 OR EQUIVALENT.
 4 TORQUE LUG NUTS TO 85-90 FT. LBS.
 5 NOTE ORIENTATION OF THE HOLES TO ITEMS 6 & 8 (REAR).
 6 ROUTE DRIVE MOTOR HOSES THROUGH ITEM #37.

UNLESS OTHERWISE SPECIFIED:
 TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.00
 TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00





Drawing # 2 of 3



Drawing # 3 of 3

Chassis Assembly, Nissan Dual Fuel

068316-015

Drawing #1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068870-001	CHASSIS WELDMENT R/T	1
2	109114-000	FRONT AXLE ASSEMBLY	1
3	068327-004	TIRE/WHEEL ASSY. R.H.	2
4	068327-005	TIRE/WHEEL ASSY. L.H.	2
5	109117-000	SLEW DRIVE ASSEMBLY	1
6	109087-000	HUB - PLANETARY	2
7	100388-000	GASKET	4
8	109113-000	BRAKE ASSEMBLY	2
9	109112-000	MOTOR ASSEMBLY-LEFT REAR	1
10	011239-008	WASHER, FLAT ASTM A325 1/2"	4
11	011256-034	HHCS 1/2-13 X 4-1/4 GRADE 5	4
12	011297-010	WASHER, BELLVILLE 5/8	18
13	011291-032	HHCS 5/8-11 X 4, GRADE 8	18
14	109093-000	AXLE LOCK CYLINDER ASSY	2
15	068869-001	THRUST RING (UHMW)	2
16	068847-000	AXLE RETAINER	1
17	011257-042	HHCS 5/8-11 X 5-1/4, GRADE 5	1
18	011248-010	NUT, HEX 5/8-11 ESNA	1
19	068906-000	CYLINDER PIN	4
20	068898-002	LYNCH PIN	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
21	011737-016	ROLLPIN 1/4 DIA. X 2" LG.	4
22	011469-005	LUG NUT, 9/16-18NF 90	36
23	011257-012	HHCS, 5/8-11 X 1 1/2, GRADE 5	12
24	011239-010	WASHER, FLAT ASTM A325 5/8"	12
25	068916-000	ENGINE COWLING	1
26	063783-002	LANYARD ASSY. X 5-1/2	2
27	011252-004	HHCS 1/4-20 X 1/2, GRADE 5	2
28	011246-004	HEX NUT 1/4-20 ESNA THIN	2
29	068878-000	COWLING PLATE	2
30	068898-001	LYNCH PIN	2
31	068904-000	DRAW LATCH	2
32	013965-006	HHCS 10-24 X 3/4, GRADE 5	8
33	011240-003	WASHER FLAT STD #10	8
34	011248-003	NUT, 10-24 ESNA	8
35	109111-000	MOTOR ASSEMBLY-RIGHT REAR	1
36	062642-023	BUSHING	2
37	065369-099	HOSE GUARD, NYLON	4 FT

* Not shown

Drawing #2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
201	109121-000	RADIATOR HOSE, BOTTOM	1
202	109096-000	ENGINE MOUNT - NISSAN REAR	2
203	109120-000	RADIATOR HOSE, TOP	1
204	109100-000	EXHAUST FLANGE ADAPTOR (PREASSEM)	REF
205	069205-000	HYDRAULIC TANK ASSY. R/T (28 GAL)	1
206	068909-000	BRACKET, OVERFLOW TANK	1
207	068774-000	VIBRATION ISOLATOR	2
208	068890-000	INLET HOSE, AIR FILTER	1
209	068915-001	MUFFLER-RT	1
210	109109-000	VALVE BLOCK ASSY. R/T DRIVE	1
211	068903-000	AIR CLEANER	1
212	068903-001	RAIN CAP, AIR CLEANER	1
213	068903-002	CLAMP, AIR CLEANER	1
214	068866-000	ACCESS COVER	1
215	-	SCRW, SOC. HD. M8-1.25 X 30 MM.	REF
216	109052-000	FUEL TANK ASSY	1
217	011240-006	WASHER, FLAT STD. 3/8	10
218	011248-006	LOCKNUT, HEX. 3/8-16UNC ESNA	10
219	109131-000	ENGINE ASSY. R/T NISSAN	1
221	011253-008	SCRW, HHC. 5/16-18UNC X 1	8
222	011248-005	LOCKNUT, HEX. 5/16-18UNC ESNA.	6
223	020541-018	HOSE CLAMP	2
224	020541-011	HOSE CLAMP	4
225	068941-000	HEAT SHIELD	1
226	109079-002	FAN SHROUD	1
228	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	10
229	011254-010	SCRW, HHC. GR5 3/8-16UNC X 1-1/4	10
230	011253-022	SCRW, HHC. 5/16-18UNC X 2-3/4	2
231	062299-002	BATTERY, 12 VDC	1
232	-	GASKET(PREASSEMBLED TO ENGINE)	REF
233	068961-000	GASKET (INCLUDED WITH ENGINE)	REF
236	064275-048	BATTERY CABLE, POSITIVE (48")	1
237	064275-034	BATTERY CABLE, NEGATIVE (34")	1
238	068887-000	RADIATOR, R/T	1
239	069229-001	RADIATOR SUPPORT BRKT WELDMENT	1
240	068549-000	HOLD DOWN BAR, BATTERY	1
241	012039-000	ROD, BATTERY HOLD DOWN	2
242	011240-005	WASHER, FLAT STD 5/16	8
243	011250-005	NUT, HEX 5/16-18UNC	4
244	068863-000	GRILL, RADIATOR	1
245	068966-000	OVERFLOW BOTTLE	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
246	REF.	TUBE (SUPPLIED WITH ITEM 245)	1
247	011248-004	LOCKNUT, 1/4-20UNC. ESNA	9
248	011252-008	SCR, HHC. 1/4-20UNC X 1	2
249	109130-000	COVER - ACCESS	1
250	068865-000	OUTLET PLATE	1
251	014252-004	NUTSERT 1/4-20 UNC	4
252	011238-004	LOCKWASHER 1/4 SPLIT	4
253	011715-004	SCREW RD HD #6-32 X 1/2	2
254	011248-047	LOCKNUT #6-32 HEX	2
255	013259-006	MUFFLER CLAMP, 1 1/2"	1
256	029945-014	LEVEL SENSOR (DOM)	REF
257	020541-003	HOSE CLAMP #6	8
258	029961-000	INLET	1
259	029961-001	SEAL	1
260	011253-010	SCREW HHC 5/16-18 X 1-1/4	2
261	011252-004	SCREW HHC 1/4-20 X 1/2	4
262	011240-004	WASHER FLAT STD 1/4	7
263	011256-016	SCREW HHC 1/2-13 X 2	2
265	020398-012	CLAMP - LOWER RADIATOR HOSE	2
266	011840-008	SCREW, HWH TYPE-F. #10-24 UNC X 1	2
267	011240-003	WASHER - FLAT #10	2
268	011248-003	LOCKNUT - #10-24 UNC ESNA	2
269	011252-006	SCREW, HHC 1/4-20 UNC X 3/4	3
**271	-	CLAMP, HOSE, 1 5/8"	2
**272	-	CLAMP, HOSE, 2 1/8"	1
273	029480-099	WIRE, 10 GA RED	.8 FT
274	029601-021	CONN. RING (12-10GA) 3/8	2
**275	-	FILTER, LPG	1
**276	-	FILTER, GAS	1
**277	-	PUMP, GAS	1
**278	-	FITTING, STR	1
**279	-	FITTING, 90	1
**280	-	FITTING, STR BARBED	1
**281	109150-010	WIRE HARNESS - NISSAN ENGINE	1
**282	109150-011	WIRE HARNESS - NISSAN ENGINE	1
283	067615-048	LPG HOSE ASSY, 5/16 X 26" LG	2
284	012733-099	HOSE, FUEL 5/16	A/R

* Not shown

** Items 271 - 272 & 275 - 282 included with engine

Drawing #3

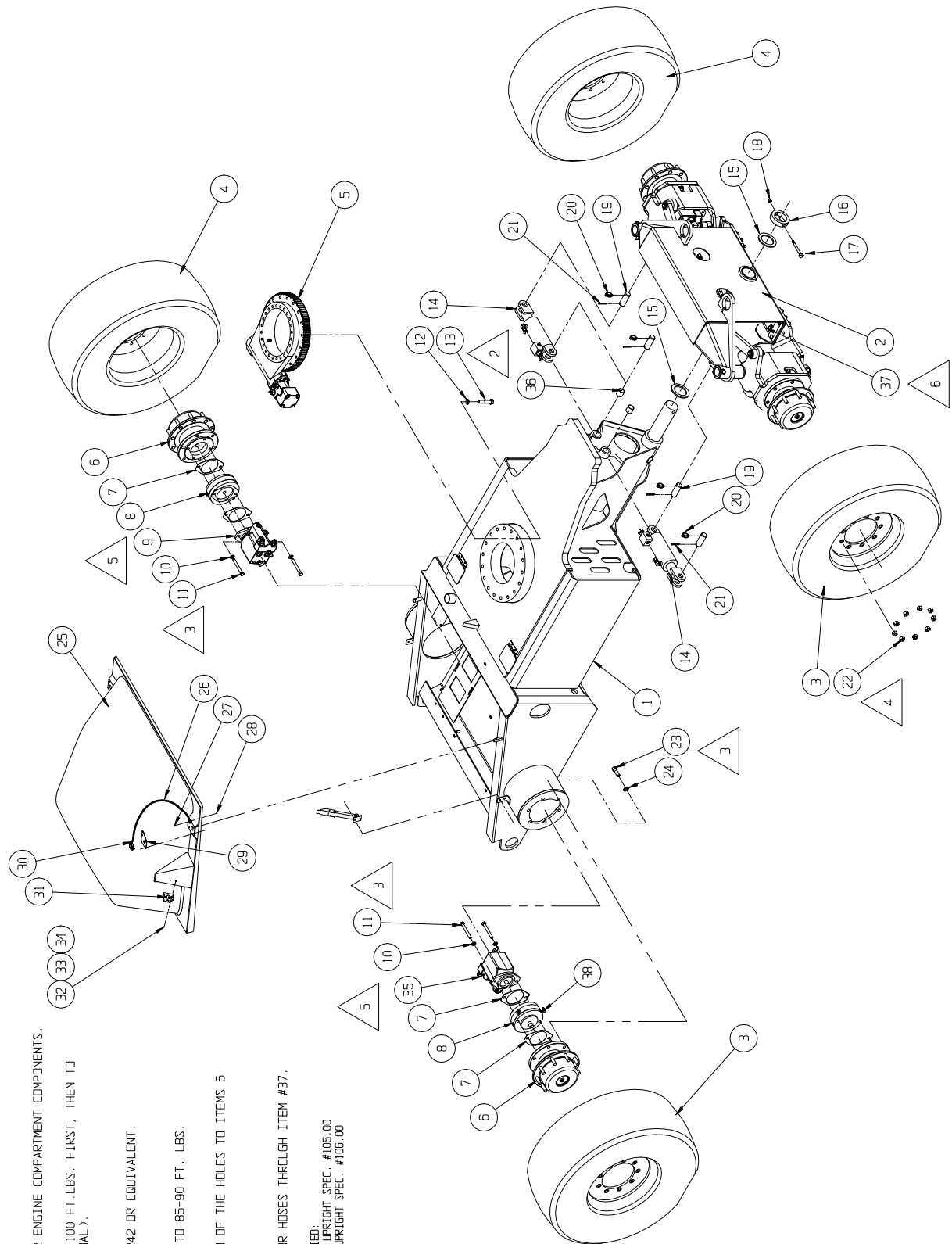
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
301	014250-003	WELD STUD, 3/8-16 UNC X 1	4
302	027934-003	TANK, PROPANE	1
303	067615-070	ADAPTER, LPG TANK (LP-20)	1
304	067615-074	FITTING, RUN TEE 1/4" NPT BRASS (LP-24)	1
305	068990-023	FITTING, FLARE 3/8 TUBE-1/4NPT45 EL (LP-33)	1
306	067615-075	VALVE, RELIEF (LP-25)	1

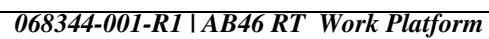
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
307	027823-000	MOUNTING BRACKET, PROPANE TANK	1
308	011248-006	LOCKNUT, 3/8-16 UNC ESNA	4
309	011240-006	WASHER, 3/8" FLAT	4

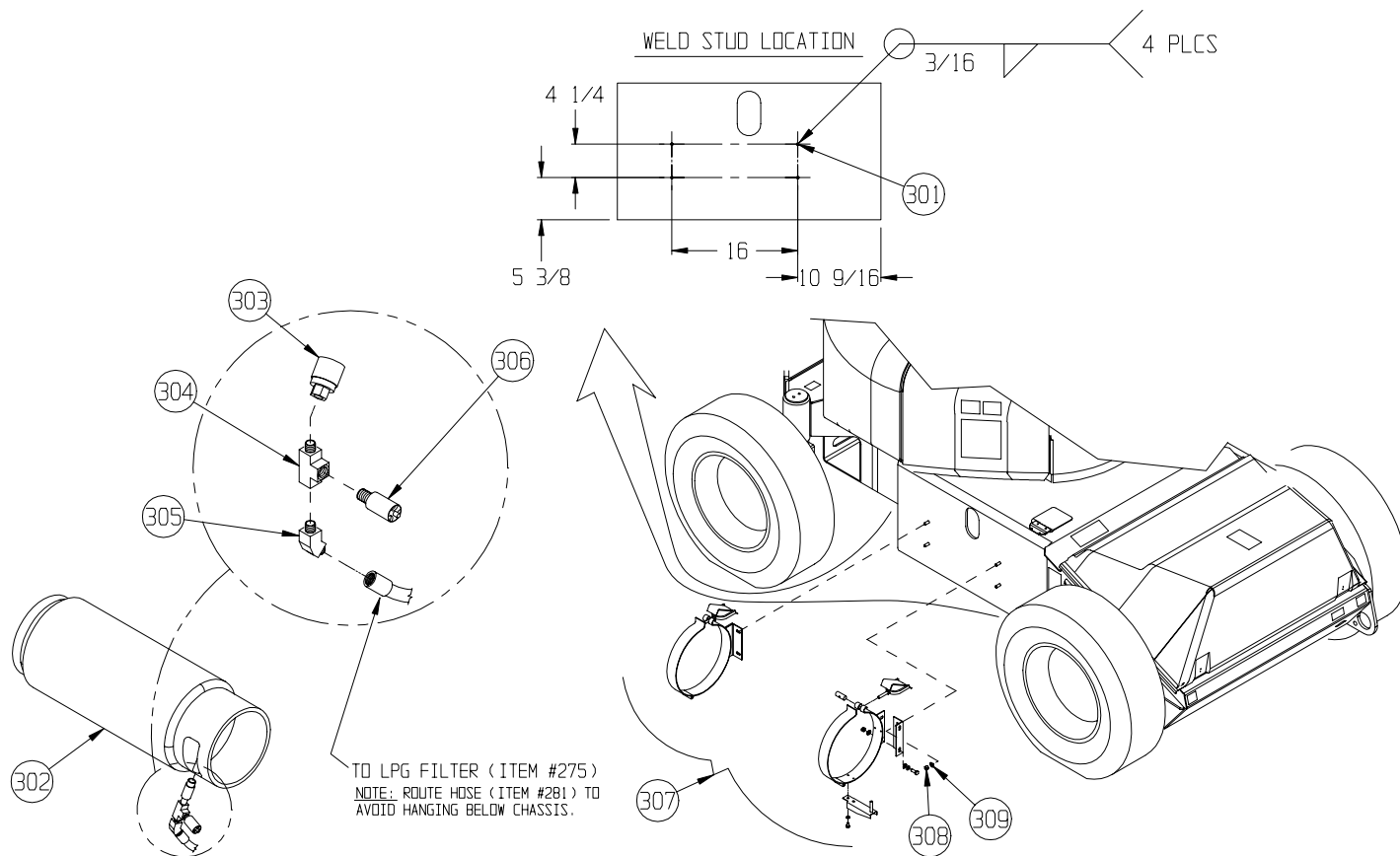
NOTES:

- 1 SEE SHEET #2 FOR ENGINE COMPARTMENT COMPONENTS.
- 2 TORQUE BOLTS TO 100 FT. LBS. FIRST, THEN TO 190 FT. LBS. (FINAL).
- 3 APPLY LOCTITE #242 OR EQUIVALENT.
- 4 TORQUE LUG NUTS TO 85-90 FT. LBS.
- 5 NOTE ORIENTATION OF THE HOLES TO ITEMS 6 & 8 (REAR).
- 6 ROUTE DRIVE MOTOR HOSES THROUGH ITEM #37.

UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.00
TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00







Drawing # 3 of 3

Chassis Assembly, JD Diesel

068316-011

Drawing #1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068870-000	CHASSIS WELDMENT R/T	1
2	011256-012	SCRW HHC 1/2-13UNC X 1 1/2	2
3	011239-008	WASHER, FLAT ASTM A325 1/2 Ø	48
4	011248-008	LOCKNUT, HEX ESNA 1/2-13UNC	12
5	068839-002	STEERING YOKE, L/H	1
6	068839-001	STEERING YOKE, R/H	1
7	068690-000	HYD. MOTOR, SUNDSTRAND	2
	068690-010	SEAL KIT	
8	068847-000	AXLE RETAINER	1
9	068905-000	STEERING PIN,	2
10	068456-001	CYLINDER, STEERING	1
*	068456-011	SEAL KIT	1
11	011253-020	SCRW HHC GR5 5/16-18UNC X2-1/2	2
12	011239-005	WASHER, FLAT ASTM A325 5/16 DIA.	4
13	011740-016	ROLPIN, 1/2 Ø X 2 LG.	2
14	011248-005	LOCKNUT, HEX ESNA 5/16-18UNC	2
15	068838-101	STEERING PIVOT WELDMENT	2
16	011256-018	SCRW, HHC GR5 1/2-13UNC X 2 1/4	4
17	062642-033	BRG. GARLOCK #20DU16	4
18	068380-000	STEERING PIN, SHORT	2
19	068835-001	FRONT AXLE WELDMENT	1
20	011240-008	WASHER, FLAT STD. 1/2"	4
21	011256-030	SCRW. HHC, GR 5 1/2-13UNC X 3 3/4	2
22	011257-014	SCRW. HHC, GR 5 5/8-11UNC X 1 3/4	12
23	068886-000	CYLINDER,	2
*	068886-010	SEAL KIT	1
24	068576-001	BUSHING, GARLOCK #GF4852-40	2
25	068885-000	FITTING, SWIVEL	4
26	068327-004	TIRE/WHEEL ASSY. R.H.	2
27	068327-005	TIRE/WHEEL ASSY. L.H.	2
28	011257-012	SCRW. HHC, GR 5 5/8-11UNC X 1 1/2	12
29	068869-001	THRUST RING (UHMW)	2
30	068869-002	THRUST RING	4
31	011297-010	WASHER, BELLVILLE Ø 5/8	18
32	011469-005	LUG NUT, 9/16-18NF 90	36
33	011238-008	WASHER, SPLIT LOCK 1/2"	2
34	011737-016	ROLLPIN 1/4 DIA. X 2" LG.	4
35	068959-003	WASHER, SQ. STL. Ø1/2" 2 X 2 X 1/4 THK.	2
36	011225-008	WASHER, FENDER 1/2"	2
37	062642-023	BUSHING, GARLOCK #20DU20	4
38	011941-011	FITTING, STR. ADAPTER 8MB-10MJ	4
40	012004-004	PLUG, #4 S.A.E.	4
41	064297-001	P.O. CHECK VALVE	2
42	011934-001	FITTING, 90° 4MB-4MJ	6
43	011941-001	FITTING, STR. ADAPTER 4MB-4MJ	2

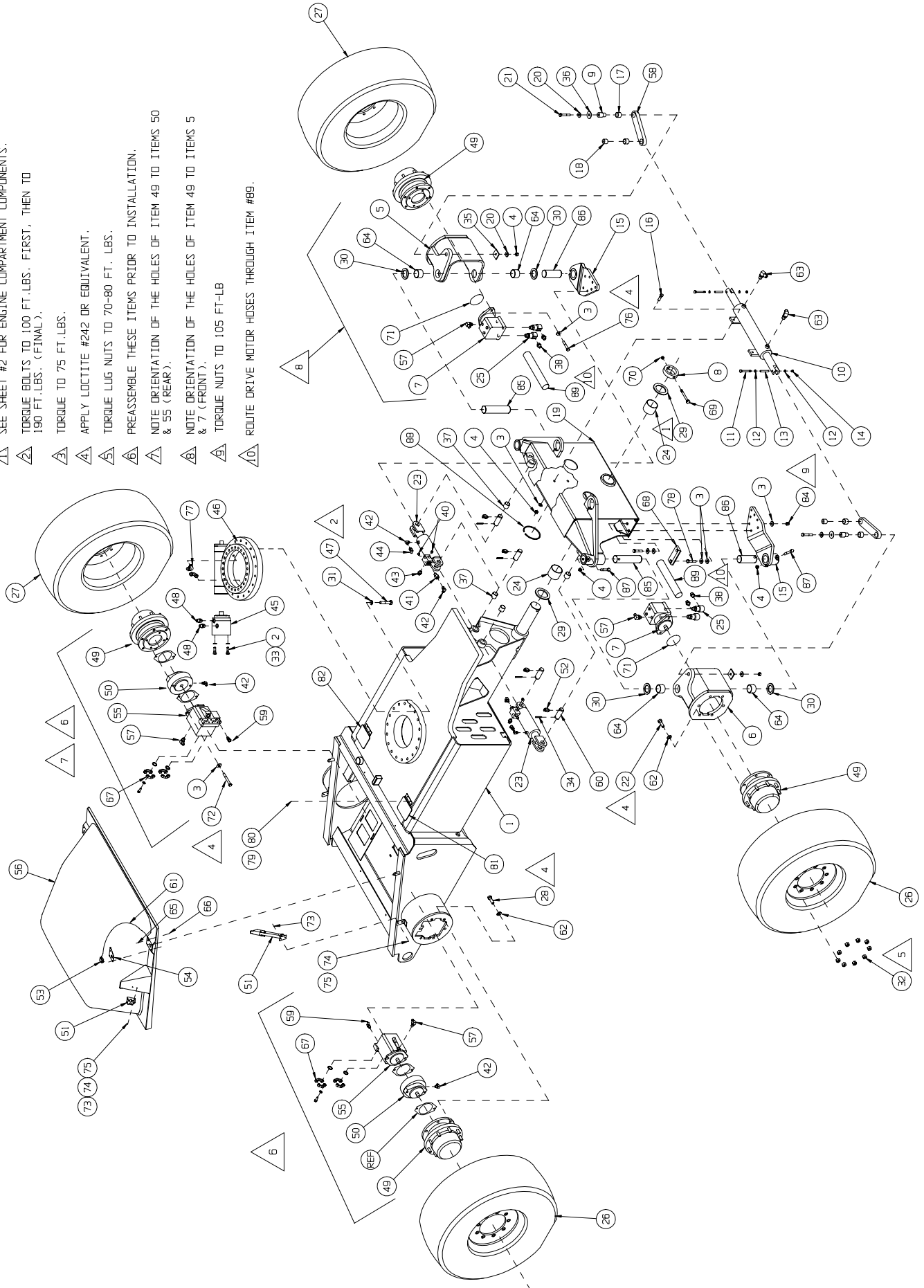
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
44	011932-001	FITTING, 45° 4FJX-4MJ	2
45	068575-000	HYD. MOTOR, WHITE	1
46	068571-000	DRIVE, WORM GEAR	1
47	014576-026	SCRW. GR 8 HHC. 5/8-11UNF X 3 1/4	18
48	011941-038	FITTING, STR. ADAPTER 10MB-4MJ	2
49	068884-000	PLANETARY DRIVE, FAIRFIELD	4
50	068569-001	BRAKE, AUSCO #75620	2
*	068569-010	SEAL KIT	1
51	068904-000	DRAW LATCH	2
52	068898-002	LYNCH PIN, (PIVOT POINT #HANG-2)	4
53	068898-001	LYNCH PIN, (PIVOT POINT #HANG-1)	2
54	068878-000	COWLING PLATE	2
55	068882-000	HYD. MOTOR,	2
*	068882-010	SEAL KIT	
56	068916-000	ENGINE COWLING	1
57	011934-007	FITTING, 90° 8MB-6MJ	4
58	068902-000	STEERING LINK	2
59	011935-001	FITTING, 45° 4MB-4MJ	2
60	068906-000	CYLINDER PIN	4
61	063783-002	LANYARD ASSY. X 5-1/2	2
62	011239-010	WASHER, FLAT ASTM A325 5/8 DIA.	24
63	011934-004	FITTING, 90° 6MB-6MJ	2
64	068899-001	BUSHING, GARLOCK GM3236-24	4
65	011252-004	SCREW, HHC 1/4-20 X 1/2	2
66	011246-004	HEX NUT 1/4-20 ESNA THIN	2
67	068647-000	FLANGE KIT, 12SFO	4
68	109060-000	PAD, U.H.M.W.	2
69	011257-042	SCRW. HHC, GR 5 5/8-11 X 5 1/4	1
70	011248-010	NUT, HEX 5/8-11 ESNA	1
71	013888-063	"O" RING	2
72	011256-034	SCRW, HHC, GR5 1/2-13UNC X 4 1/4	4
73	013965-006	SCRW, HHC 10-24 X 3/4	8
74	011240-003	WASHER FLAT STD #10	8
75	011248-003	NUT, 10-24 ESNA	8
76	011256-010	SCRW HHC, 1/2-13UNC X 1 1/4	4
77	068680-007	FITTING, 90° ELBOW	2
78	011266-220	SCRW, HHC GR8 1/2-20 UNF X 2-1/2	12
81	068386-001	DOOR WELDMENT RH	1
82	068386-000	DOOR WELDMENT LH	1
84	011249-108	NUT HEX ESNA 1/2-20UNF GR8	12
85	109058-000	KING PIN, UPPER	2
86	109059-000	KING PIN, LOWER	2
87	011256-028	SCRW, HHC. 1/2-13 UNC X 3-1/2	4
88	102483-099	EDGE PROTECTOR	A/R
89	100385-099	HOSE GUARD NYLON	A/R

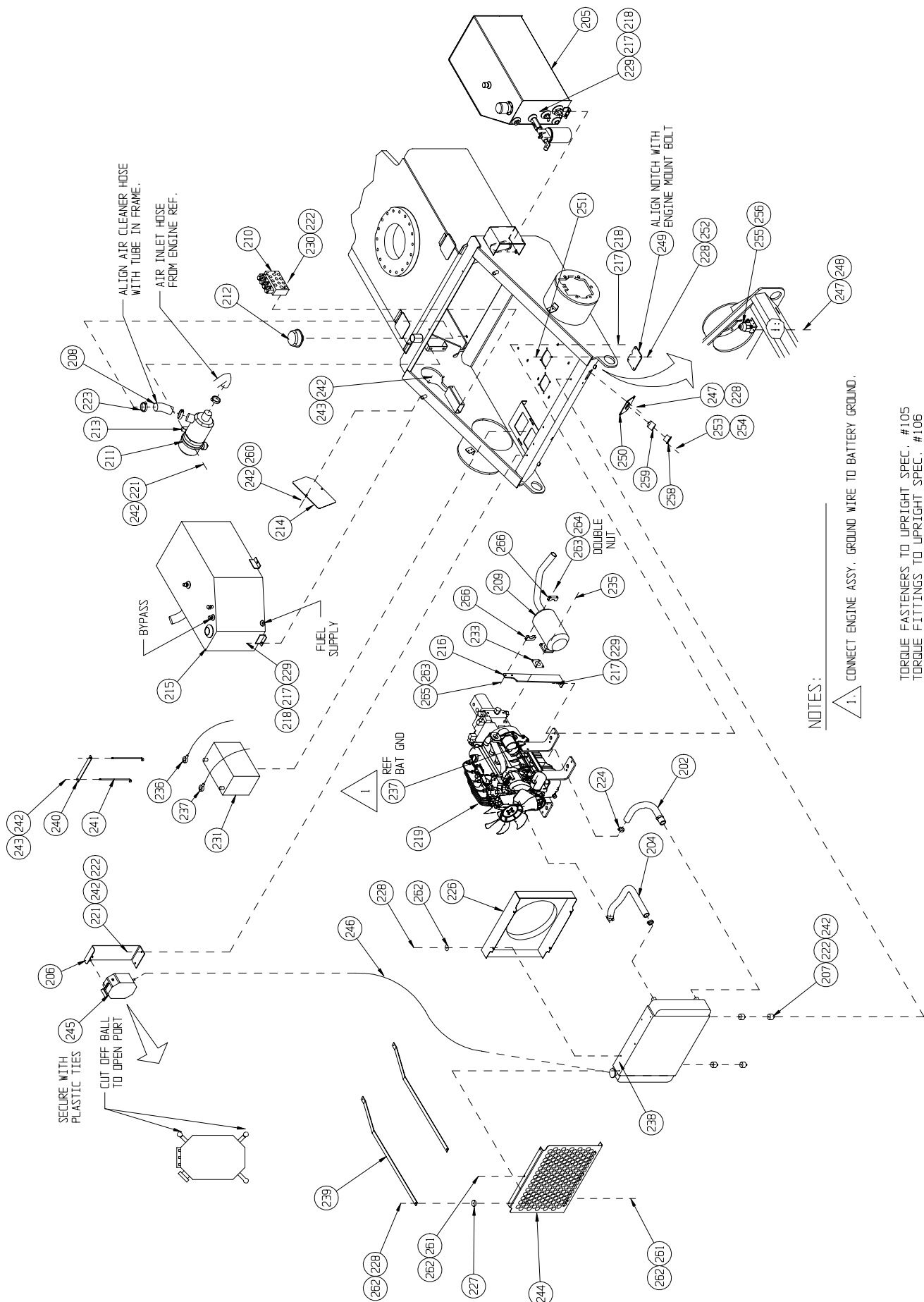
Drawing #2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
202	109077-000	RADIATOR HOSE, BOTTOM (KUBOTA)	1
204	109076-000	RADIATOR HOSE, TOP (KUBOTA)	1
205	069205-000	HYDRAULIC TANK ASSY. R/T (28 GAL)	1
206	069211-000	BRACKET, OVERFLOW TANK	1
207	068774-000	VIBRATION ISOLATOR	4
208	068890-000	INLET HOSE, AIR FILTER	1
209	068915-001	MUFFLER-RT	1
210	068953-000	VALVE BLOCK ASSY. R/T DRIVE	1
211	068903-00	AIR CLEANER	1
212	068903-001	RAIN CAP, AIR CLEANER	1
213	068903-002	CLAMP, AIR CLEANER	1
214	068866-000	ACCESS COVER	1
215	068710-001	FUEL TANK ASSY. DIESEL	1
216	109082-000	MUFFLER BRACE	1
217	011240-006	WASHER, FLAT STD. 3/8	14
218	011248-006	LOCKNUT, HEX. 3/8-16UNC ESNA	16
220	068872-010	ENGINE ASSY. R/T KUBOTA DIESEL	1
221	011253-008	SCRW, HHC. 5/16-18UNC X 1	2
222	011248-005	LOCKNUT, HEX. 5/16-18UNC ESNA.	4
223	020541-018	HOSE CLAMP	3
224	020541-011	HOSE CLAMP	4
226	109079-000	WELDMENT - FAN SHROUD	1
227	068934-000	SHROUD SPACER	2
228	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	12
229	011254-012	SCRW, HHC. GR5 3/8-16UNC X 1-1/2	13
230	011253-008	SCRW, HHC. 5/16-18UNC X 2-3/4	2
231	062299-002	BATTERY, 12 VDC	1
233	REF	EXHAUST FLANGE GASKET (DSL)	1
235	063961-020	SCR, HHC. M8-1.25 X 20MM LG.	4
236	064275-048	BATTERY CABLE, POSITIVE (48")	1
237	064275-034	BATTERY CABLE, NEGATIVE (34")	1
238	068887-000	RADIATOR, R/T	1
239	068864-000	RADIATOR, SUPPORT BRKT WELDMENT	2
240	068549-000	HOLD DOWN BAR, BATTERY	1
241	012039-000	ROD, BATTERY HOLD DOWN	2
242	011240-005	WASHER, FLAT STD 5/16	6
243	011250-005	NUT, HEX 5/16-18UNC	2
244	068863-000	GRILL, RADIATOR	1
245	068966-000	OVERFLOW BOTTLE	1
246	REF.	TUBE (SUPPLIED WITH ITEM 245)	1
247	011248-004	LOCKNUT, 1/4-20UNC. ESNA	6
248	011252-008	SCR, HHC. 1/4-20UNC X 1	2
249	068867-000	DRAIN COVER	2
250	068865-000	OUTLET PLATE	1
251	014252-004	NUTSERT 1/4-20 UNC	8
252	011238-004	LOCKWASHER 1/4 SPLIT	6
253	011715-004	SCREW RD HD #6-32 X 1/2	2
254	011248-047	LOCKNUT #6-32 HEX	2
255	029945-013	LEVEL SENSOR (EUR)	REF
256	029945-014	LEVEL SENSOR (DOM)	REF
258	029961-000	INLET	1
259	029961-001	SEAL	1
260	011253-010	SCREW HHC 5/16-18 X 1-1/4	2
261	011252-004	SCREW HHC 1/4-20 X 1/2	4
262	011240-004	WASHER FLAT STD 1/4	8
263	011240-005	WASHER FLAT STD 5/16	4
264	011250-005	NUT HEX - 5/16-18 UNC	4
265	011253-028	SCREW HHC 5/16-18 UNC X 3 1/2 LG	2
266	109083-000	MUFFLER CLAMP	2

NOTES:

- △ SEE SHEET #2 FOR ENGINE COMPARTMENT COMPONENTS.
- △ TORQUE BOLTS TO 100 FT.-LBS. FIRST, THEN TO 190 FT.-LBS. <FINAL>.
- △ TORQUE TO 75 FT.-LBS.
- △ APPLY LOCTITE #242 OR EQUIVALENT.
- △ TORQUE LUG NUTS TO 70-80 FT. LBS.
- △ PREASSEMBLE THESE ITEMS PRIOR TO INSTALLATION.
- △ NOTE ORIENTATION OF THE HOLES OF ITEM 49 TO ITEMS 50 & 55 (REAR).
- △ NOTE ORIENTATION OF THE HOLES OF ITEM 49 TO ITEMS 5 & 7 (FRONT).
- △ TORQUE NUTS TO 105 FT.-LB
- △ ROUTE DRIVE MOTOR HOSES THROUGH ITEM #89.





Chassis Assembly, JD Diesel

068316-014

Drawing #1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068870-001	CHASSIS WELDMENT R/T	1
2	109114-000	FRONT AXLE ASSEMBLY	1
3	068327-004	TIRE/WHEEL ASSY. R.H.	2
4	068327-005	TIRE/WHEEL ASSY. L.H.	2
5	109117-000	SLEW DRIVE ASSEMBLY	1
6	109087-000	HUB - PLANETARY	2
7	100388-000	GASKET	4
8	109113-000	BRAKE ASSEMBLY	4
9	109112-000	MOTOR ASSEMBLY-LEFT REAR	1
10	011239-008	WASHER, FLAT ASTM A325 1/2"	4
11	011256-034	HHCS 1/2-13 X 4-1/4 GRADE 5	4
12	011297-010	WASHER, BELLVILLE 5/8	18
13	011291-032	HHCS 5/8-11 X 4, GRADE 8	18
14	109093-000	AXLE LOCK CYLINDER ASSY	2
15	068869-001	THRUST RING (UHMW)	2
16	068847-000	AXLE RETAINER	1
17	011257-042	HHCS 5/8-11 X 5-1/4, GRADE 5	1
18	011248-010	NUT, HEX 5/8-11 ESNA	1
19	068906-000	CYLINDER PIN	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
20	068898-002	LYNCH PIN	4
21	011737-016	ROLLPIN 1/4 DIA. X 2" LG.	4
22	011469-005	LUG NUT, 9/16-18NF 90	36
23	011257-012	HHCS, 5/8-11 X 1 1/2, GRADE 5	12
24	011239-010	WASHER, FLAT ASTM A325 5/8"	12
25	068916-000	ENGINE COWLING	1
26	063783-002	LANYARD ASSY. X 5-1/2	2
27	011252-004	HHCS 1/4-20 X 1/2, GRADE 5	2
28	011246-004	HEX NUT 1/4-20 ESNA THIN	2
29	068878-000	COWLING PLATE	2
30	068898-001	LYNCH PIN	2
31	068904-000	DRAW LATCH	2
32	013965-006	HHCS 10-24 X 3/4, GRADE 5	8
33	011240-003	WASHER FLAT STD #10	8
34	011248-003	NUT, 10-24 ESNA	8
35	109111-000	MOTOR ASSEMBLY-RIGHT REAR	1
36	062642-023	BEARING	2
37	100385-099	HOSE GUARD, NYLON	A/R

Drawing #2

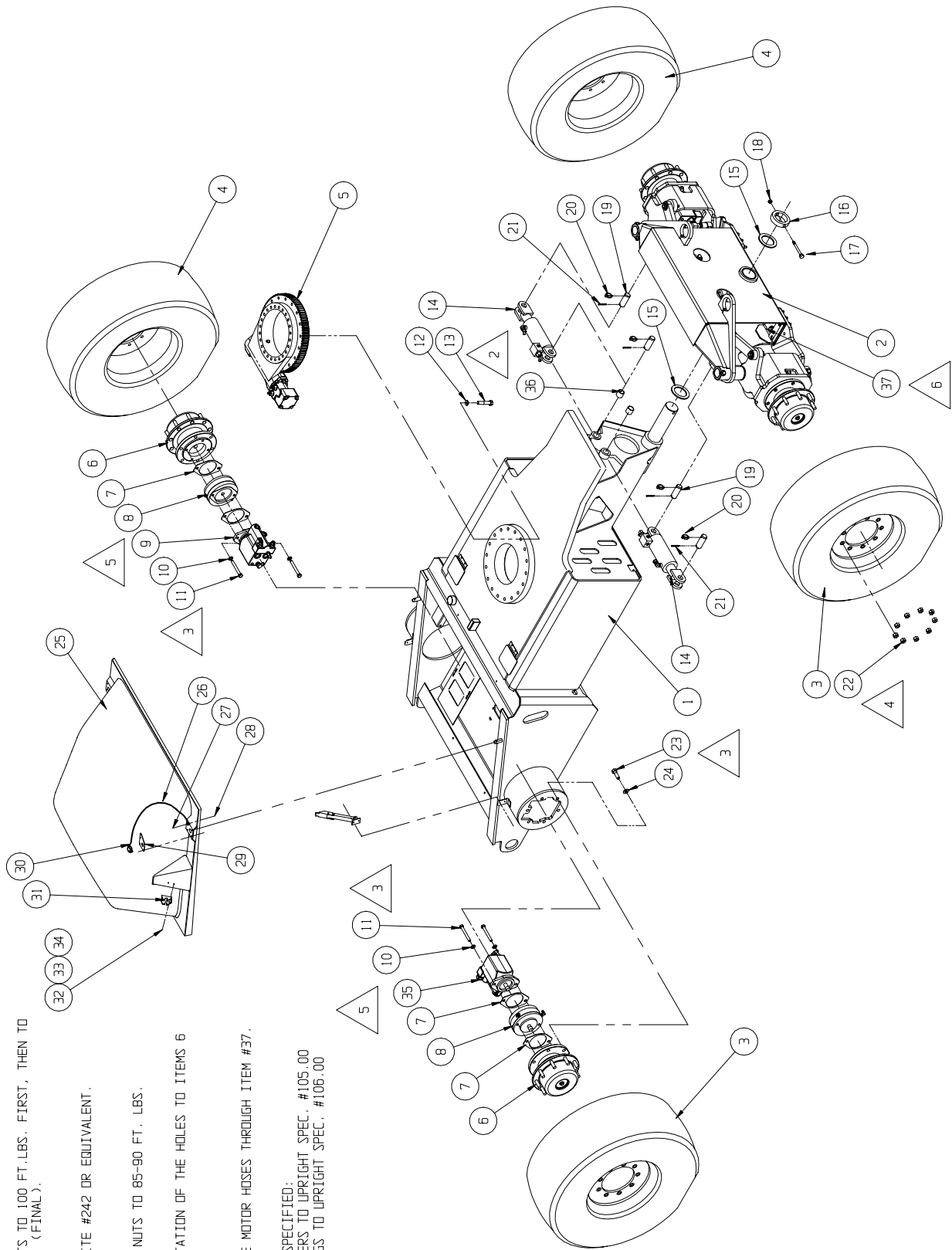
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
202	068896-000	RADIATOR HOSE, BOTTOM (DIESEL)	1
204	068895-000	RADIATOR HOSE, TOP (DIESEL)	1
205	069205-000	HYDRAULIC TANK ASSY. R/T (28 GAL)	1
206	068909-000	BRACKET, OVERFLOW TANK	1
207	068774-000	VIBRATION ISOLATOR	2
208	068890-000	INLET HOSE, AIR FILTER	1
209	068915-001	MUFFLER-RT	1
210	109109-000	VALVE BLOCK ASSY. R/T DRIVE	1
211	068903-000	AIR CLEANER	1
212	068903-001	RAIN CAP, AIR CLEANER	1
213	068903-002	CLAMP, AIR CLEANER	1
214	068866-000	ACCESS COVER	1
215	068710-001	FUEL TANK ASSY. DIESEL	1
217	011240-006	WASHER, FLAT STD. 3/8	14
218	011248-006	LOCKNUT, HEX. 3/8-16UNC ESNA	16
220	068872-000	ENGINE ASSY. R/T DSL	1
221	011253-008	SCRW, HHC. 5/16-18UNC X 1	4
222	011248-005	LOCKNUT, HEX. 5/16-18UNC ESNA.	6
223	020541-018	HOSE CLAMP	3
224	020541-011	HOSE CLAMP	4
226	068868-001	FAN SHROUD	1
227	068934-000	SHROUD SPACER	4
228	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	11
229	011254-012	SCRW, HHC. GR5 3/8-16UNC X 1-1/2	13
230	011253-022	SCRW, HHC. 5/16-18UNC X 2-3/4	2
231	062299-002	BATTERY, 12 VDC	1
233	068961-000	EXHAUST FLANGE GASKET (DSL)	1

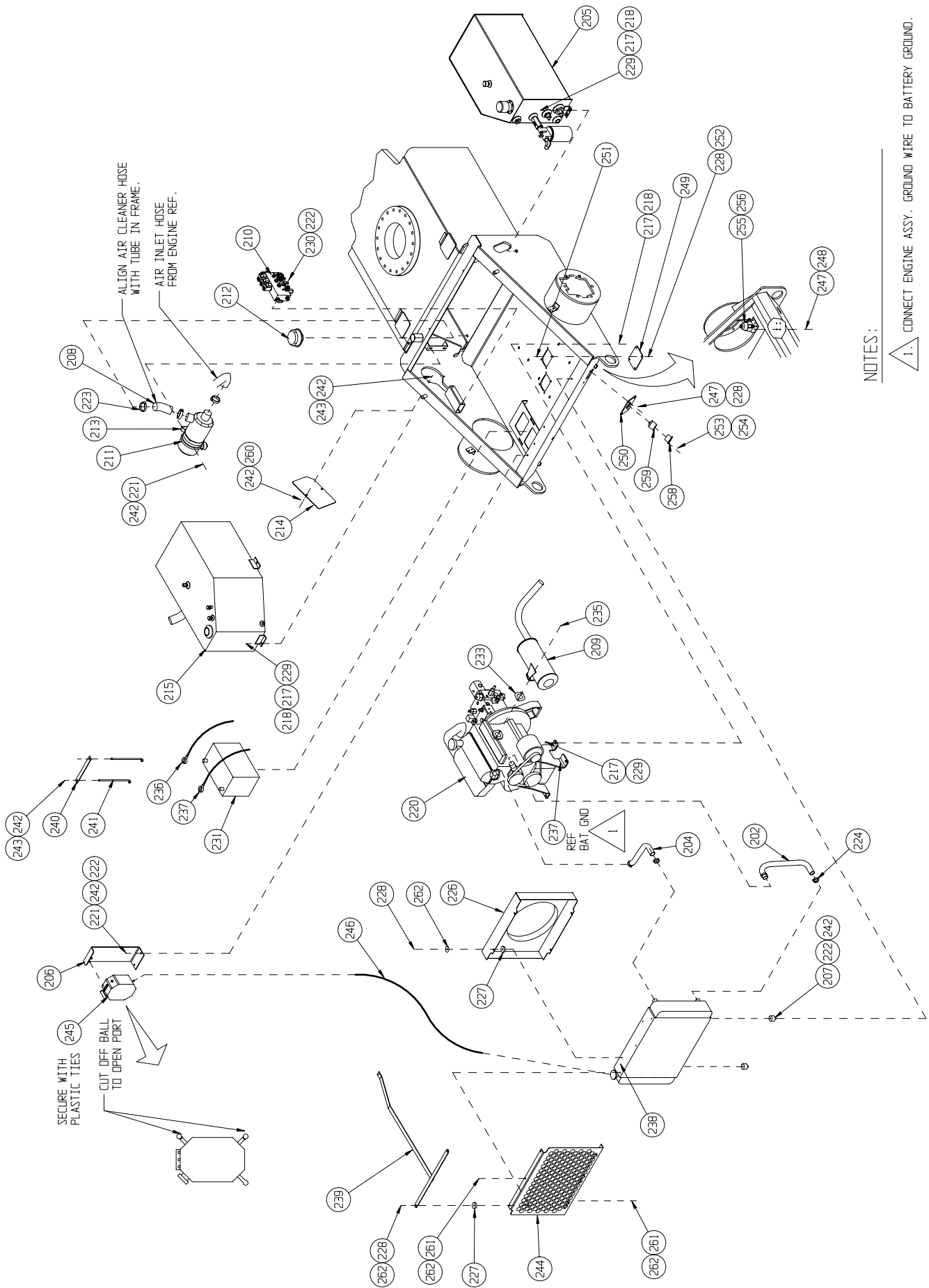
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
235	063961-020	SCR, HHC. M8-1.25 X 20MM LG.	4
236	064275-048	BATTERY CABLE, POSITIVE (48")	1
237	064275-034	BATTERY CABLE, NEGATIVE (34")	1
238	068887-000	RADIATOR, R/T	1
239	069229-001	RADIATOR SUPPORT BRKT WELDMENT	1
240	068549-000	HOLD DOWN BAR, BATTERY	1
241	012039-000	ROD, BATTERY HOLD DOWN	2
242	011240-005	WASHER, FLAT STD 5/16	6
243	011250-005	NUT, HEX 5/16-18UNC	4
244	068863-000	GRILL, RADIATOR	1
245	068966-000	OVERFLOW BOTTLE	1
246	0 REF.	TUBE (SUPPLIED WITH ITEM 245)	1
247	011248-004	LOCKNUT, 1/4-20UNC. ESNA	5
248	011252-008	SCR, HHC. 1/4-20UNC X 1	2
249	068867-000	DRAIN COVER	2
250	068865-000	OUTLET PLATE	1
251	014252-004	NUTSERT 1/4-20 UNC	8
252	011238-004	LOCKWASHER 1/4 SPLIT	6
253	011715-004	SCREW RD HD #6-32 X 1/2	2
254	011248-047	LOCKNUT #6-32 HEX	2
255	029945-013	LEVEL SENSOR (EUR)	REF
256	029945-014	LEVEL SENSOR (DOM)	REF
258	029961-000	INLET	1
259	029961-001	SEAL	1
260	011253-010	SCREW HHC 5/16-18 X 1-1/4	2
261	011252-004	SCREW HHC 1/4-20 X 1/2	4
262	011240-004	WASHER FLAT STD 1/4	8

NOTES:

- 1 SEE SHEET #2 FOR ENGINE COMPARTMENT COMPONENTS.
- 2 TORQUE BOLTS TO 100 FT.LBS. FIRST, THEN TO 190 FT.LBS. (FINAL).
- 3 APPLY LOCTITE #242 OR EQUIVALENT.
- 4 TORQUE LUG NUTS TO 85-90 FT. LBS.
- 5 NOTE ORIENTATION OF THE HOLES TO ITEMS 6 & 8 (REAR).
- 6 ROUTE DRIVE MOTOR HOSES THROUGH ITEM #37.

UNLESS OTHERWISE SPECIFIED:
 TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.00
 TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00





NOTES:

1. CONNECT ENGINE ASSY. GROUND WIRE TO BATTERY GROUND.

TORQUE FASTENERS TO UPRIGHT SPEC. #105
TORQUE FITTINGS TO UPRIGHT SPEC. #106

Chassis Assembly, Kubota Diesel

068316-016

Drawing #1

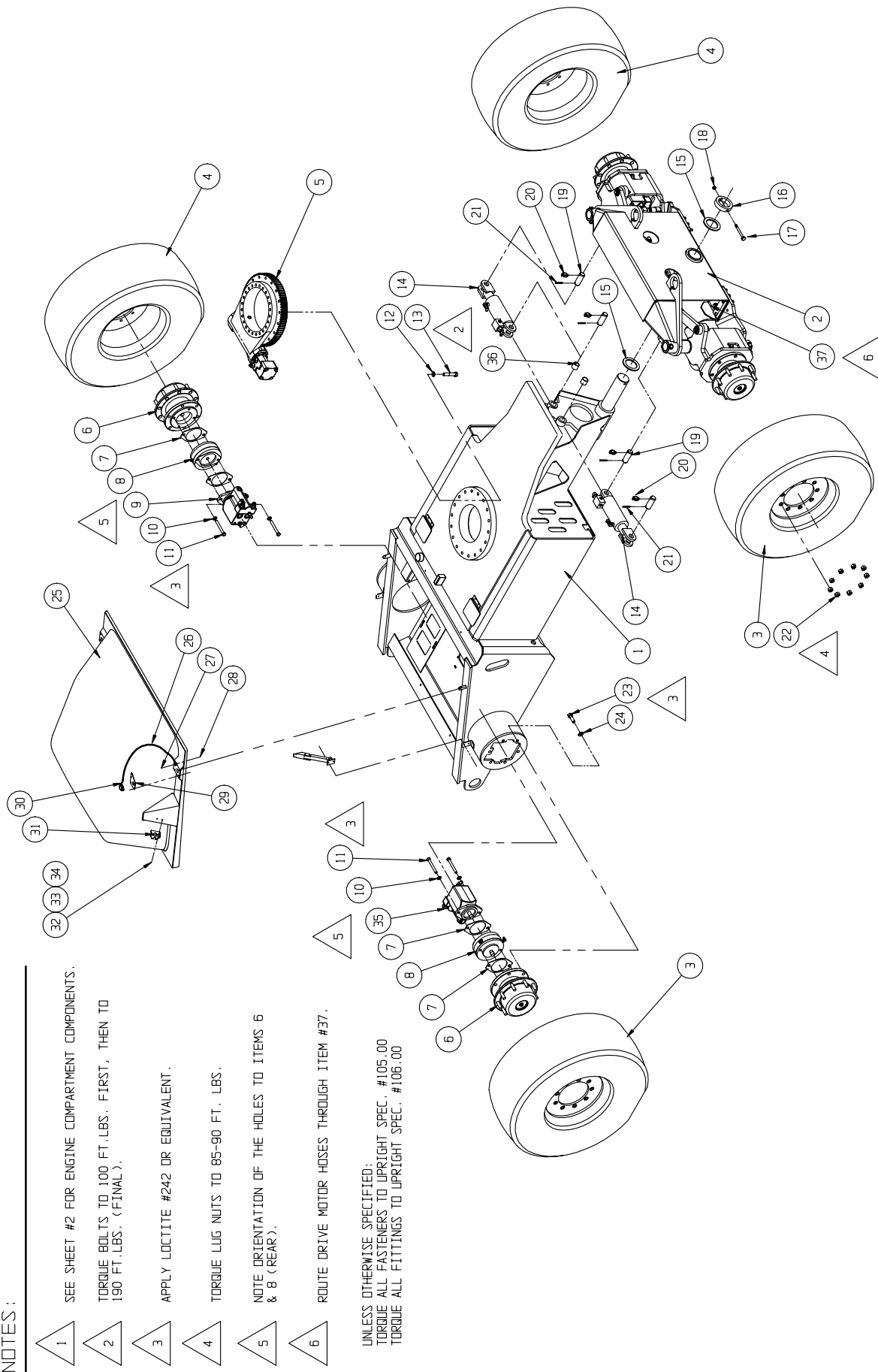
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068870-001	CHASSIS WELDMENT R/T	1
2	109114-000	FRONT AXLE ASSEMBLY	1
3	068327-004	TIRE/WHEEL ASSY. R.H.	2
4	068327-005	TIRE/WHEEL ASSY. L.H.	2
5	109117-000	SLEW DRIVE ASSEMBLY	1
6	109087-000	HUB - PLANETARY	2
7	100388-000	GASKET	4
8	109113-000	BRAKE ASSEMBLY	2
9	109112-000	MOTOR ASSEMBLY-LEFT REAR	1
10	011239-008	WASHER, FLAT ASTM A325 1/2"	4
11	011256-034	HHCS 1/2-13 X 4-1/4 GRADE 5	4
12	011297-010	WASHER, BELLVILLE 5/8	18
13	011291-032	HHCS 5/8-11 X 4, GRADE 8	18
14	109093-000	AXLE LOCK CYLINDER ASSY	2
15	068869-001	THRUST RING (UHMW)	2
16	068847-000	AXLE RETAINER	1
17	011257-042	HHCS 5/8-11 X 5-1/4, GRADE 5	1
18	011248-010	NUT, HEX 5/8-11 ESNA	1
19	068906-000	CYLINDER PIN	4

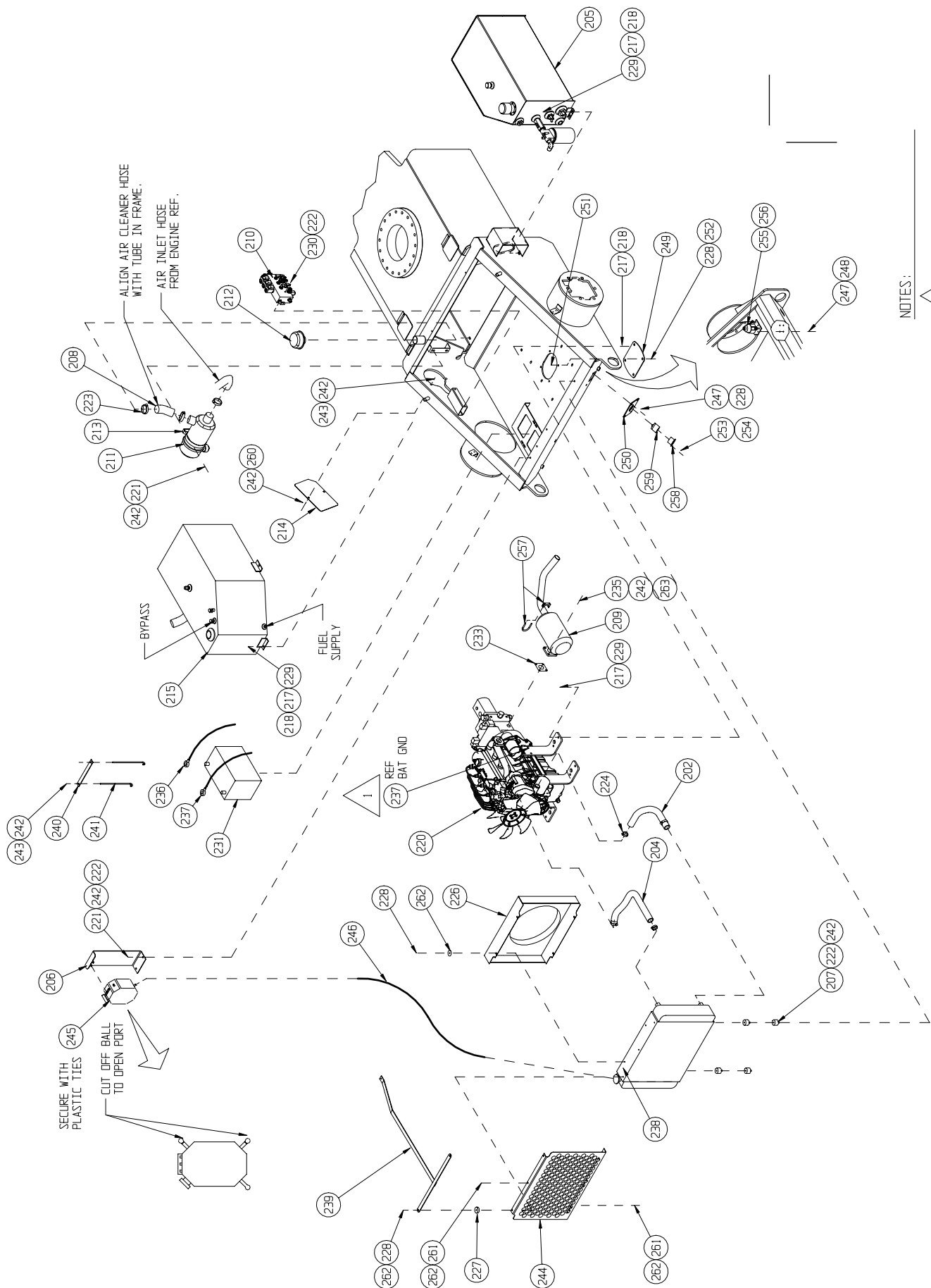
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
20	068898-002	LYNCH PIN	4
21	011737-016	ROLLPIN 1/4 DIA. X 2" LG.	4
22	011469-005	LUG NUT, 9/16-18NF 90	36
23	011257-012	HHCS, 5/8-11 X 1 1/2, GRADE 5	12
24	011239-010	WASHER, FLAT ASTM A325 5/8"	12
25	068916-000	ENGINE COWLING	1
26	063783-002	LANYARD ASSY. X 5-1/2	2
27	011252-004	HHCS 1/4-20 X 1/2, GRADE 5	2
28	011246-004	HEX NUT 1/4-20 ESNA THIN	2
29	068878-000	COWLING PLATE	2
30	068898-001	LYNCH PIN	2
31	068904-000	DRAW LATCH	2
32	013965-006	HHCS 10-24 X 3/4, GRADE 5	8
33	011240-003	WASHER FLAT STD #10	8
34	011248-003	NUT, 10-24 ESNA	8
35	109111-000	MOTOR ASSEMBLY-RIGHT REAR	1
36	062642-023	BUSHING	2
37	065369-099	HOSE GUARD, NYLON	4 FT

Drawing #2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
202	109077-000	RADIATOR HOSE, BOTTOM (KUBOTA)	1
204	109076-000	RADIATOR HOSE, TOP (KUBOTA)	1
205	069205-000	HYDRAULIC TANK ASSY. R/T (28 GAL)	1
206	068909-000	BRACKET, OVERFLOW TANK	1
207	068774-000	VIBRATION ISOLATOR	4
208	068890-000	INLET HOSE, AIR FILTER	1
209	068915-001	MUFFLER-RT	1
210	109109-000	VALVE BLOCK ASSY. R/T DRIVE	1
211	068903-000	AIR CLEANER	1
212	068903-001	RAIN CAP, AIR CLEANER	1
213	068903-002	CLAMP, AIR CLEANER	1
214	068866-000	ACCESS COVER	1
215	068710-001	FUEL TANK ASSY. DIESEL	1
217	011240-006	WASHER, FLAT STD. 3/8	14
218	011248-006	LOCKNUT, HEX. 3/8-16UNC ESNA	16
220	068872-010	ENGINE ASSY. R/T KUBOTA DIESEL	1
221	011253-008	SCRW, HHC. 5/16-18UNC X 1	2
222	011248-005	LOCKNUT, HEX. 5/16-18UNC ESNA.	4
223	020541-018	HOSE CLAMP	3
224	020541-011	HOSE CLAMP	4
226	109079-000	WELDMENT - FAN SHROUD	1
227	068934-000	SHROUD SPACER	2
228	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	11
229	011254-012	SCRW, HHC. GR5 3/8-16UNC X 1-1/2	13
230	011253-022	SCRW, HHC. 5/16-18UNC X 2-3/4	2
231	062299-002	BATTERY, 12 VDC	1
233	REF	EXHAUST GASKET (SUPPLIED W/ENGINE)	1
235	063961-030	SCR, HHC. M8-1.25 X 30MM LG.	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
236	064275-048	BATTERY CABLE, POSITIVE (48")	1
237	064275-034	BATTERY CABLE, NEGATIVE (34")	1
238	068887-000	RADIATOR, R/T	1
239	069229-000	RADIATOR, SUPPORT BRKT	1
240	068549-000	HOLD DOWN BAR, BATTERY	1
241	012039-000	ROD, BATTERY HOLD DOWN	2
242	011240-005	WASHER, FLAT STD 5/16	10
243	011250-005	NUT, HEX 5/16-18UNC	2
244	068863-000	GRILL, RADIATOR	1
245	068966-000	OVERFLOW BOTTLE	1
246	REF.	TUBE (SUPPLIED WITH ITEM 245)	1
247	011248-004	LOCKNUT, 1/4-20UNC. ESNA	5
248	011252-008	SCR, HHC. 1/4-20UNC X 1	2
249	109130-000	DRAIN COVER	1
250	068865-000	OUTLET PLATE	1
251	014252-004	NUTSERT 1/4-20 UNC	8
252	011238-004	LOCKWASHER 1/4 SPLIT	6
253	011715-004	SCREW RD HD #6-32 X 1/2	2
254	011248-047	LOCKNUT #6-32 HEX	2
255	029945-013	LEVEL SENSOR (EUR)	REF
256	029945-014	LEVEL SENSOR (DOM)	REF
257	013259-006	MUFFLER CLAMP, 1 1/2"	1
258	029961-000	INLET	1
259	029961-001	SEAL	1
260	011253-010	SCREW HHC 5/16-18 X 1-1/4	2
261	011252-004	SCREW HHC 1/4-20 X 1/2	4
262	011240-004	WASHER FLAT STD 1/4	8
263	011238-005	LOCKWASHER, 5/16 SPLIT	4





NOTES:

1. CONNECT ENGINE ASSY. GROUND WIRE TO BATTERY GROUND.

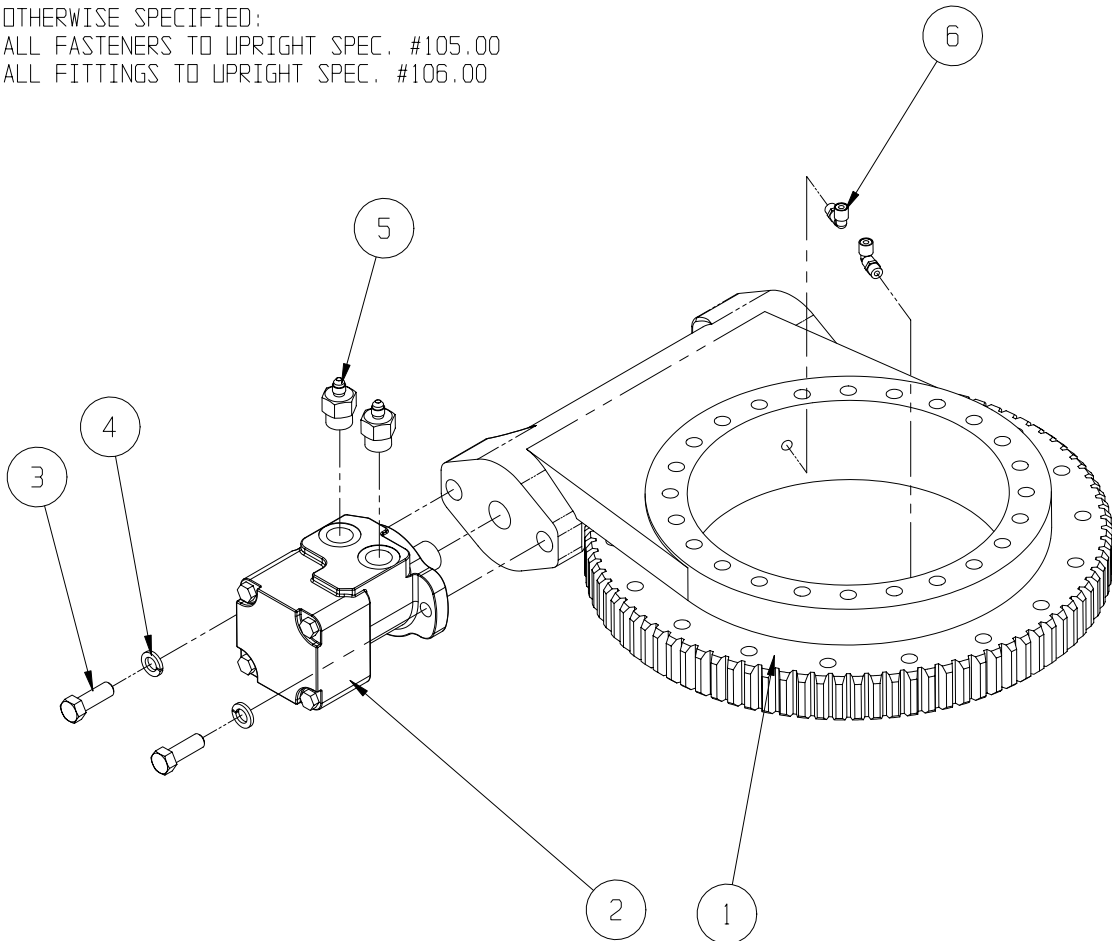
TORQUE FASTENERS TO UPRIGHT SPEC. #105
TORQUE FITTINGS TO UPRIGHT SPEC. #106

Slew Drive Assembly

109117-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068571-000	DRIVE, WORM GEAR	1
2	068575-000	MOTOR - HYDRAULIC	1
3	011256-012	HHCS 1/2-13 X 1-1/2 GRADE 5	2
4	011238-008	WASHER, SPLIT LOCK 1/2"	2
5	011941-038	FITTING, STRAIGHT 10MB-4MJ	2
6	068680-007	FITTING, ELBOW 90	2

UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.00
TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00

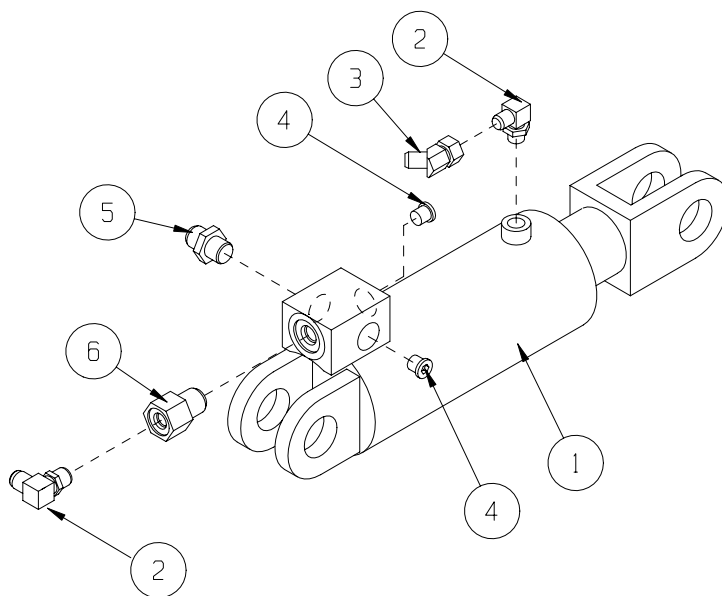


Axle Lock Cylinder Assembly

109093-000

UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068886-000	CYLINDER, AXLE LOCK	1
-	068886-010	SEAL KIT	-
2	011934-001	FITTING, ELBOW 90 4MB-4MJ	2
3	011932-001	FITTING, ELBOW 45 4FJX-4MJ	1
4	012004-004	PLUG, #4 S.A.E.	2
5	011941-001	FITTING, STR ADAPTER 4MB-4MJ	1
6	064297-001	P.O. CHECK VALVE	1

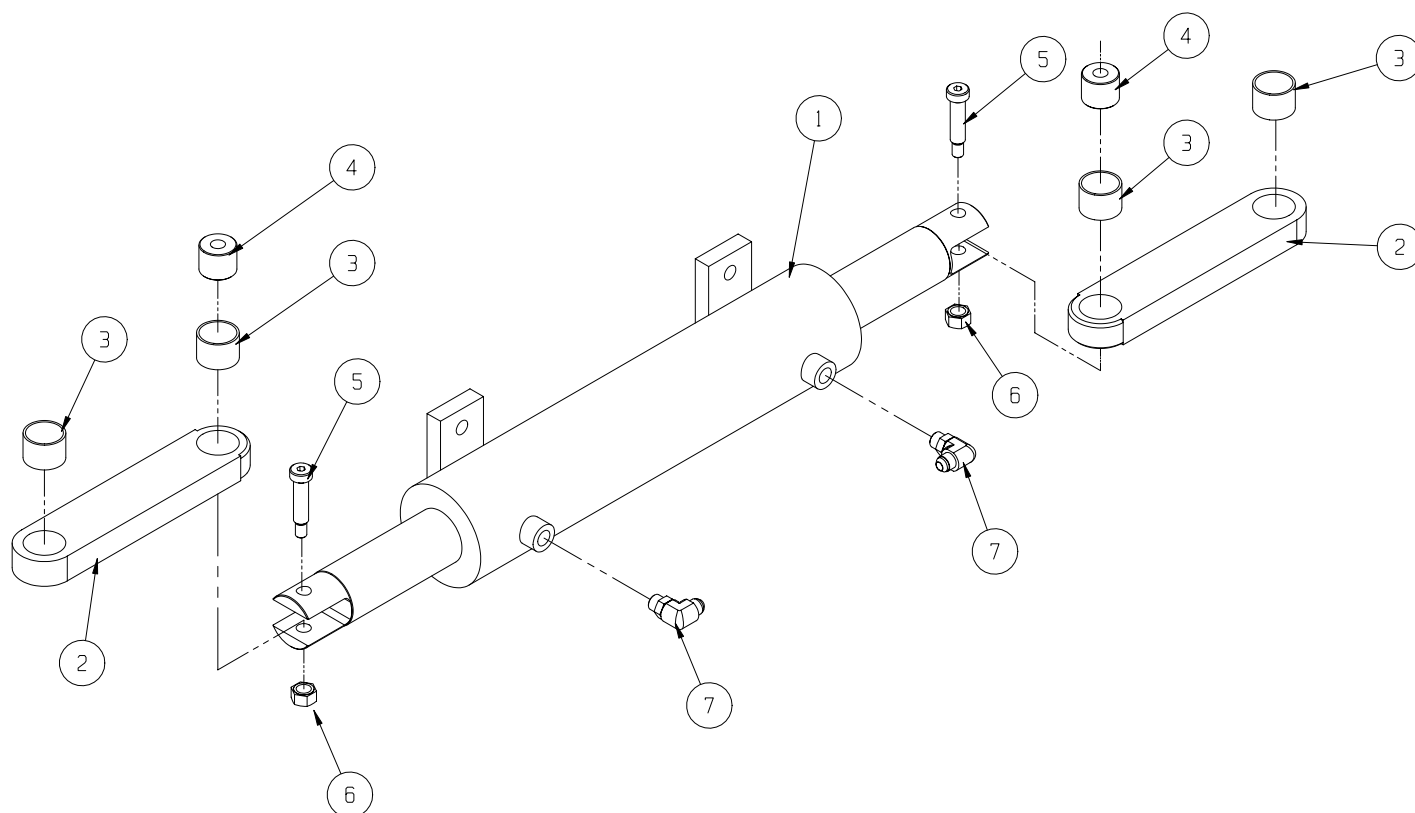


Steering Cylinder Assembly

109092-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068456-001	HYD. CYLINDER, STEERING	1
*	068456-010	SEAL KIT	-
2	068902-000	STEERING LINK	2
3	062642-033	BEARING	4
4	068380-000	STEERING PIN, SHORT	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
5	063559-001	BOLT, SHOULDER 1/2" DIA X 1 3/4" LG	2
6	011248-006	LOCKNUT, HEX ESNA 3/8-16	2
7	011934-004	FITTING, ELBOW 90 6MB-6MJ	2



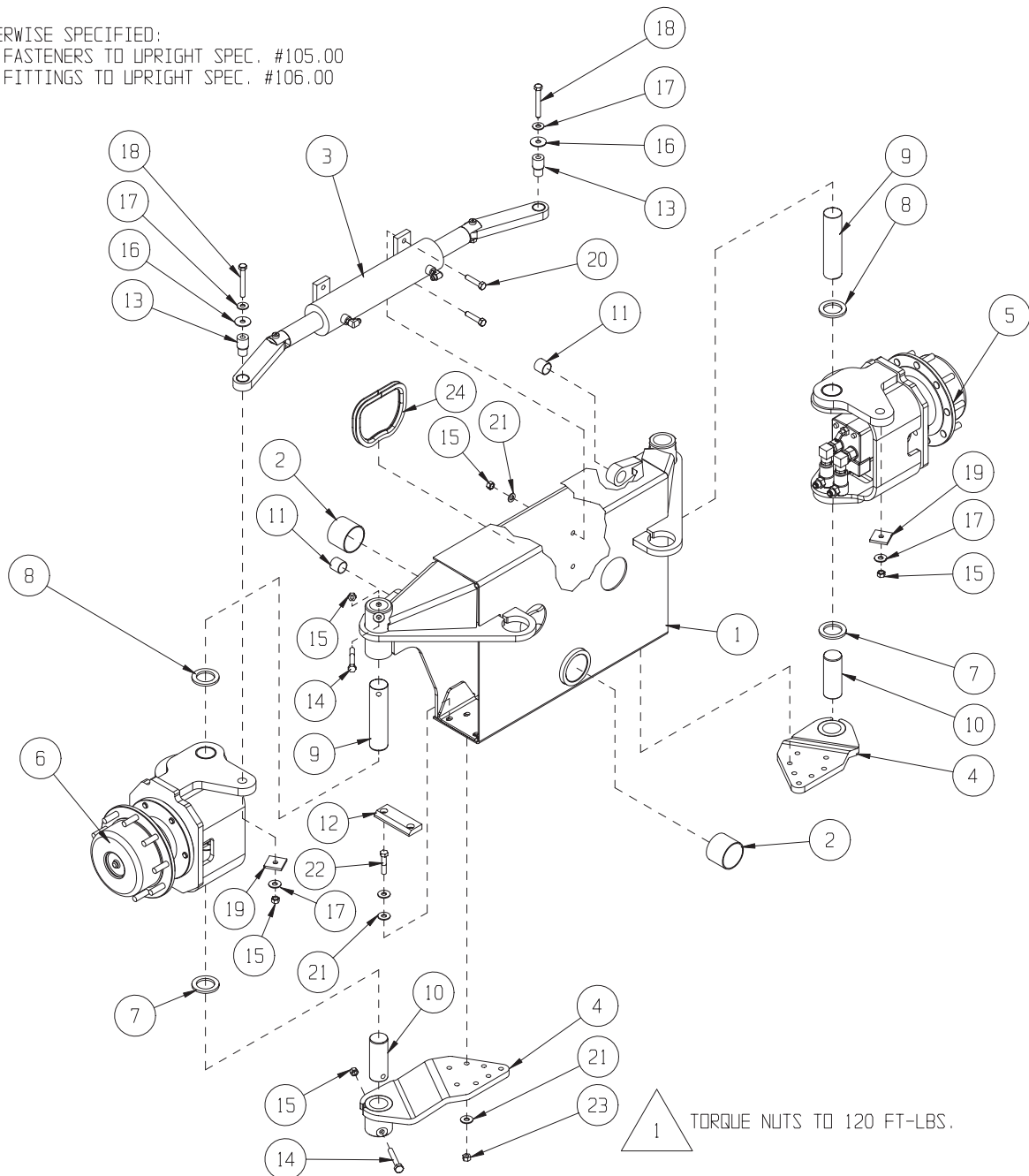
Front Axle Assembly

109114-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068835-001	FRONT AXLE WELDMENT	1
2	068576-001	BEARING	2
3	109092-000	STEERING CYLINDER ASSEMBLY	1
4	068838-101	STEERING PIVOT - MACHINED	2
5	109116-000	FRONT DRIVE ASSEMBLY LH	1
6	109115-000	FRONT DRIVE ASSEMBLY RH	1
7	068869-003	THRUST RING	2
8	068869-002	THRUST RING	2
9	109058-000	KING PIN, UPPER	2
10	109059-000	KING PIN, LOWER	2
11	062642-023	BEARING	2
12	109060-000	PAD, U.H.M.W.	2
13	068905-000	STEERING PIN	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
14	011256-030	HHCS 1/2-13 X 3 3/4 GRADE 5	4
15	011248-008	LOCKNUT, HEX ESNA 1/2-13	10
16	011225-008	WASHER, FENDER 1/2"	2
17	011240-008	WASHER, FLAT STD 1/2"	4
18	011256-030	HHCS 1/2-13 X 3 3/4, GRADE 5	2
19	068959-003	WASHER SQ. STL. 2 X 2 X 1/4	2
20	011256-018	HHCS 1/2-13 X 2 1/4, GRADE 5	4
21	011239-008	WASHER, FLAT ASTM A325 1/2"	40
22	011266-220	HHCS 1/2-20 X 2 1/2, GRADE 8	12
23	011249-108	LOCKNUT, HEX ESNA 1/2-20	12
24	067805-099	EDGE PROTECTOR	A/R

UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.00
TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00



Drive Assembly - Front Right

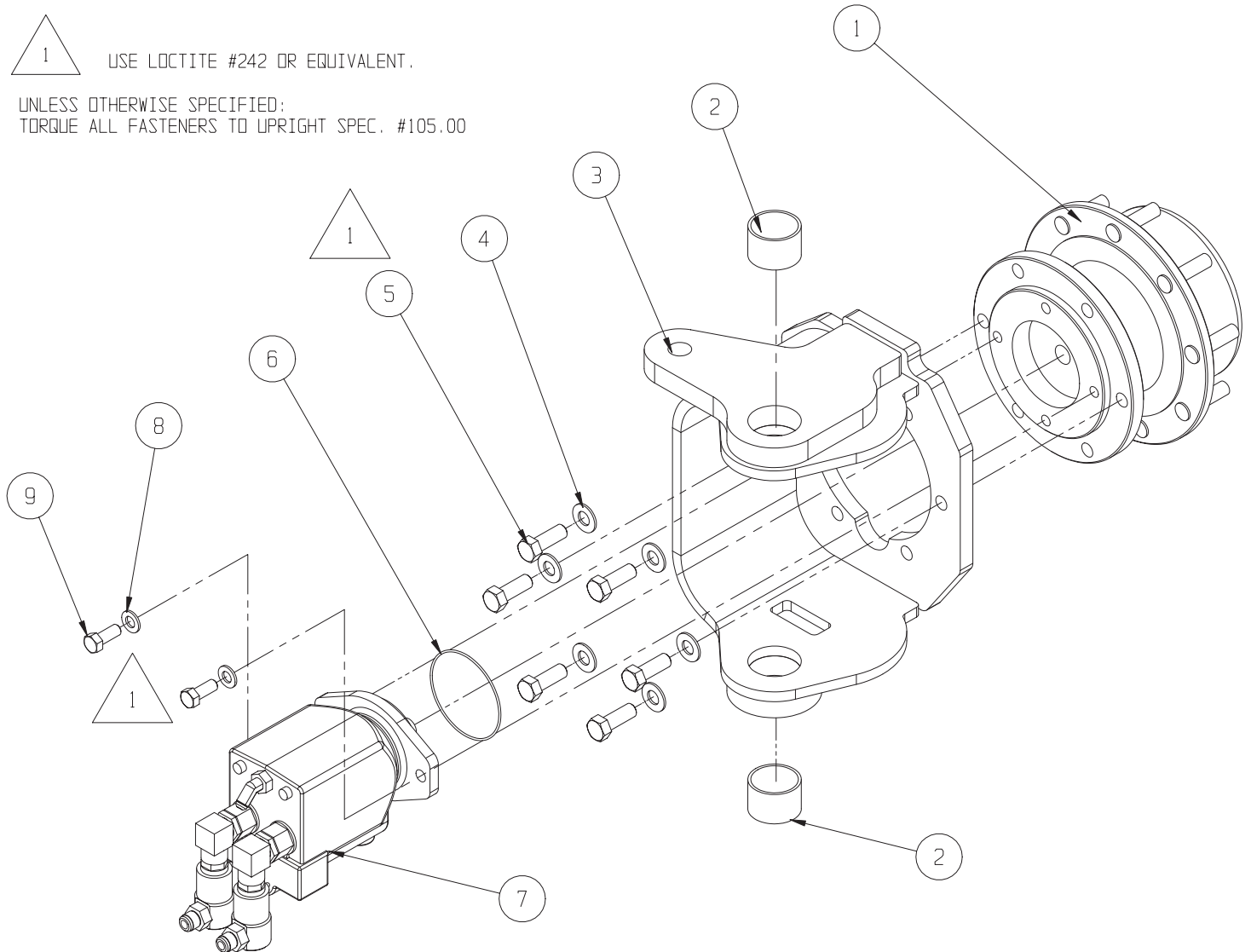
109115-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109087-000	HUB - PLANETARY	1
2	068899-001	BEARING	2
3	109064-001	WELDMENT - RH YOKE - MACHINED	1
4	011239-010	WASHER, FLAT ASTM A325 5/8"	6
5	011257-014	HHCS 5/8-11 X 1 3/4 GRADE 5	6

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
6	013888-063	O-RING	1
7	109110-000	MOTOR ASSEMBLY - FRONT	1
8	011239-008	WASHER, FLAT ASTM A325 1/2"	2
9	014033-010	HHCS 1/2-13 X 1 1/4 GRADE 8	2



USE LOCTITE #242 OR EQUIVALENT.

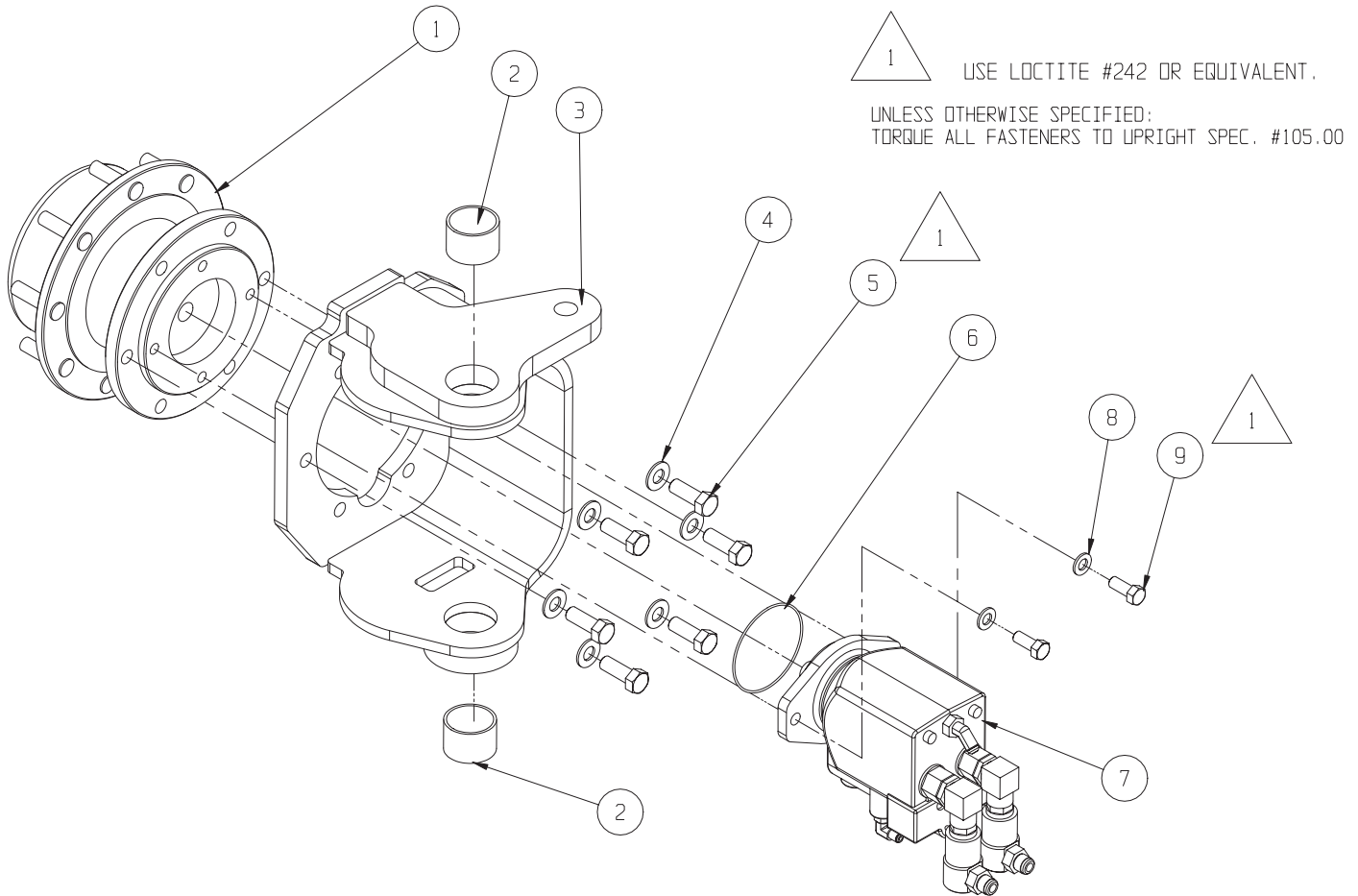
UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FASTENERS TO UPRIGHT SPEC. #105.00

Drive Assembly - Front Left

109116-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109087-000	HUB - PLANETARY	1
2	068899-001	BEARING	2
3	109064-002	WELDMENT - LH YOKE - MACHINED	1
4	011239-010	WASHER, FLAT ASTM A325 5/8"	6
5	011257-014	HHCS 5/8-11 X 1 3/4 GRADE 5	6

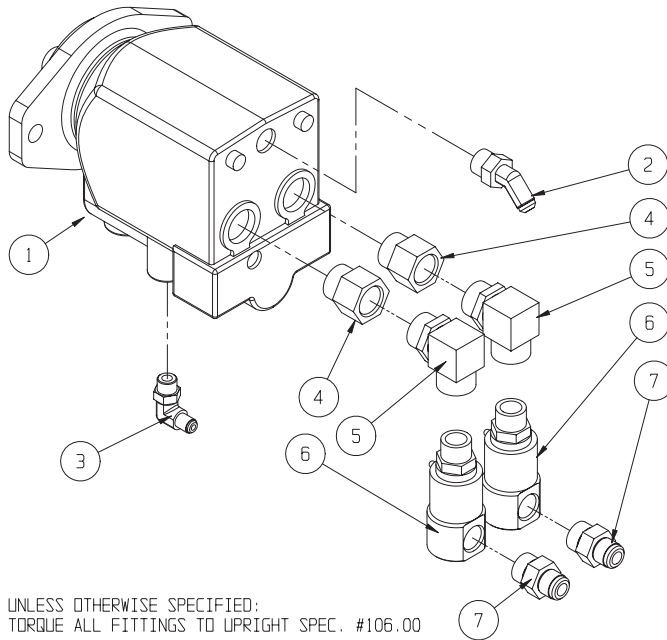
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
6	013888-063	O-RING	1
7	109110-000	MOTOR ASSEMBLY - FRONT	1
8	011239-008	WASHER, FLAT ASTM A325 1/2"	2
9	014033-010	HHCS 1/2-13 X 1 1/4 GRADE 8	2



Drive Motor Assembly - Front

109110-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109086-000	DRIVE MOTOR	1
*	-	SEAL KIT	
2	011935-012	FITTING, ELBOW 45 8MB-6MJ	1
3	011934-003	FITTING, ELBOW 90 6MB-4MJ	1
4	015717-007	FITTING, REDUCER 12MB-10FB	2
5	104386-004	FITTING, ELBOW 90 10MB-10FB	2
6	068885-000	FITTING, SWIVEL	2
7	011941-011	FITTING, STRAIGHT 8MB-10MJ	2

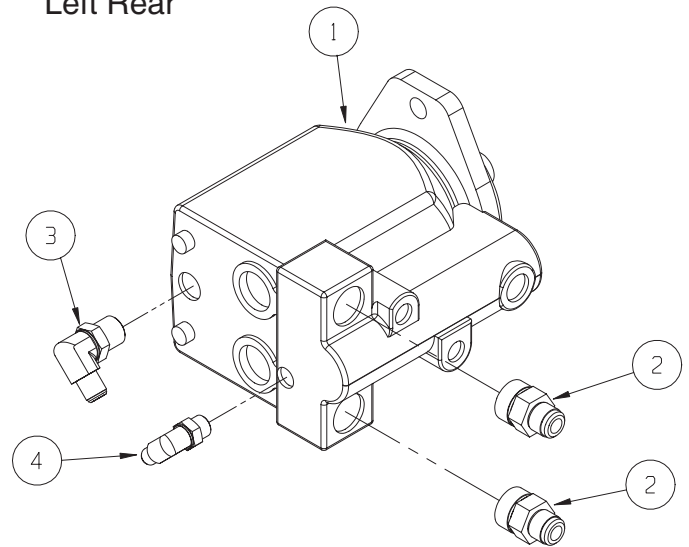
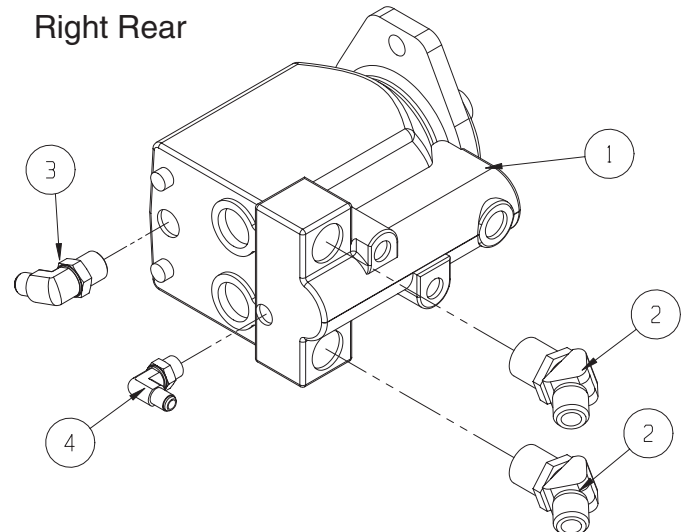
**Drive Motor Assembly - Rear**

109111-000 - Right Side

109112-000 - Left Side

109111-000 Right Side			
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109086-000	DRIVE MOTOR	1
*	-	SEAL KIT	
2	011941-019	FITTING, STRAIGHT 12MB-10MJ	2
3	011934-007	FITTING, ELBOW 90 8MB-6MJ	1
4	011934-003	FITTING, ELBOW 90 6MB-4MJ	1

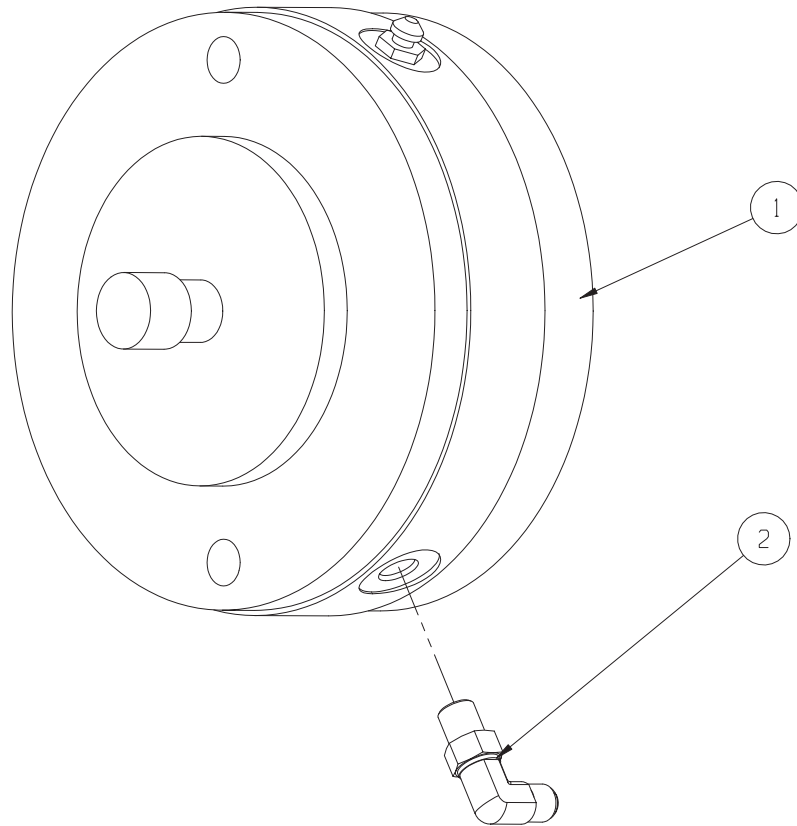
109112-000 Right Side			
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109086-000	DRIVE MOTOR	1
*	-	SEAL KIT	
2	011941-019	FITTING, STRAIGHT 12MB-10MJ	2
3	011934-007	FITTING, ELBOW 90 8MB-6MJ	1
4	011934-003	FITTING, ELBOW 90 6MB-4MJ	1

Left Rear**Right Rear**

Brake Assembly

109113-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109085-000	BRAKE	1
*	068569-010	SEAL KIT	
2	011934-001	FITTING, ELBOW 90 4MB-4MJ	1



UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FITTINGS TO UPRIGHT SPEC. #106.00

NOTES:

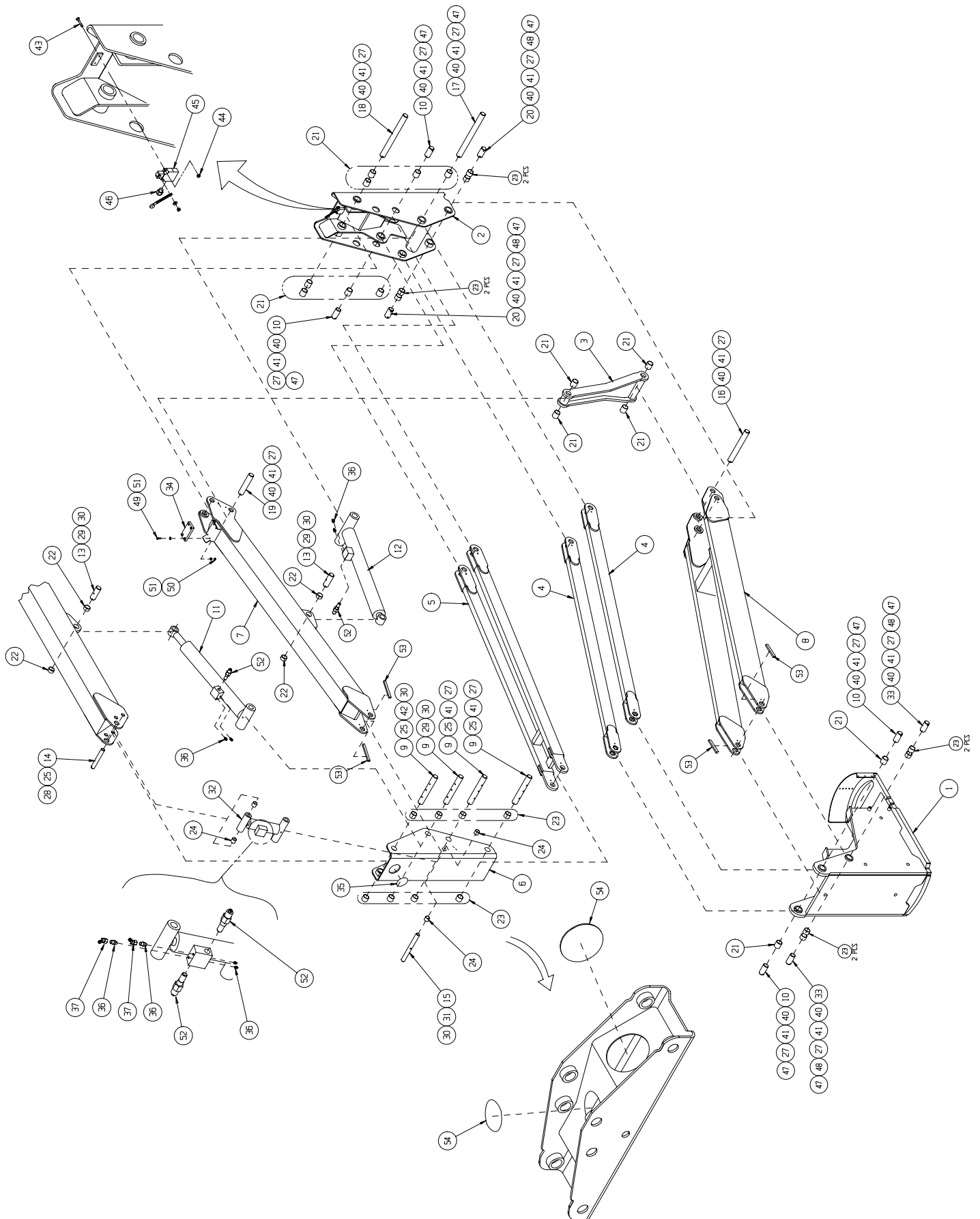
Lower Boom Linkage

068323-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068330-000	TURRET ASSEMBLY	REF
2	068397-000	RISER POST WELDMENT	1
3	068399-000	TENSION LINK WELDMENT	1
4	068400-000	1ST. TENSION RAIL WELDMENT	2
5	068543-000	2ND. TENSION RAIL WELDMENT	1
6	068412-000	FRONT RISER WELDMENT	1
7	068415-000	2ND. RISER BOOM WELDMENT	1
8	068417-000	1ST. RISER BOOM WELDMENT	1
9	068475-000	PIN, 1.75 DIA. X 12.50 LG.	4
10	068477-001	PIN, 1.75 DIA. X 4.00 LG.	4
11	068451-000	CYLINDER, BOOM RAISE	1
*	068451-010	SEAL KIT	1
12	068450-000	CYLINDER, BOOM RISER	1
*	068450-010	SEAL KIT	1
13	068477-007	PIN, 1.75 DIA. X 5.00 LG.	2
14	068796-002	PIN, 1.50 DIA. X 8.75 LG.	1
15	068796-001	PIN, 1.50 DIA. X 12.25 LG.	1
16	068477-005	PIN, 1.75 DIA. X 13.75 LG.	1
17	068477-003	PIN, 1.75 DIA. X 19.63 LG.	1
18	068477-002	PIN, 1.75 DIA. X 16.50 LG.	1
19	068477-006	PIN, 1.75 DIA. X 8.63 LG.	1
20	068794-000	PIN, 1.75 DIA. X 5.88 LG.	2
21	062642-034	BUSHING, Ø 1.75 X 2 (28DU32)	14
22	062642-028	BUSHING, Ø 1.75 X 1 (28DU16)	4
23	062642-031	BUSHING, Ø 1.75 X 1.50 (28DU24)	16
24	062642-036	BUSHING, Ø 1.50 X 1.25 (24DU20)	4
25	065214-000	ROD END (PIN RETAINER) 3/8"	4
27	011238-006	LOCKWASHER, SPLIT RING 3/8	14

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
28	011254-012	SCR, HHC 3/8-16UNC X 1 1/2	1
29	011254-028	SCR, HHC 3/8-16UNC X 3 1/2	3
30	011248-006	LOCKNUT, HEX 3/8-16UNC (ESNA)	5
31	011254-024	SCR, HHC 3/8-16UNC X 3	1
32	068454-000	MASTER CYLINDER	1
*	068454-010	SEAL KIT	1
33	068794-001	PIN	2
34	068660-000	REST PAD	1
35	066516-004	CAP, 4"	1
36	011941-004	FITTING, STR 6MB-4MJ	8
37	011932-001	FITTING, 45° 4FJX-4MJ	2
40	065214-001	ROD END (PIN RETAINER) 1/2"	12
41	011254-010	SCREW HHC 3/8-16UNC X 1-1/4"	14
42	011254-014	SCREW HHC 3/8-16UNC X 1-3/4"	1
43	011709-010	SCREW RD HD 10-24 X 1-1/4"	2
45	068556-002	SWITCH & LEVER	1
46	029925-000	STRAIN RELIEF	1
47	011240-006	WASHER, 3/8" FLAT	9
48	011739-020	ROLL PIN 3/8 X 2-1/2	4
49	011253-010	SCREW HHC 5/16-18 UNC X 1 1/4	4
50	011248-005	LOCKNUT HEX 5/16-18 UNC ESNA	4
51	014996-005	WASHER 5/16 SAE FLAT	8
52	068778-013	VALVE, COUNTERBALANCE	4
53	067805-099	GROMET PROTECTIVE 1/4 - 1/2	A/R
54	061692-099	GROMET PROTECTIVE	A/R

* Not shown



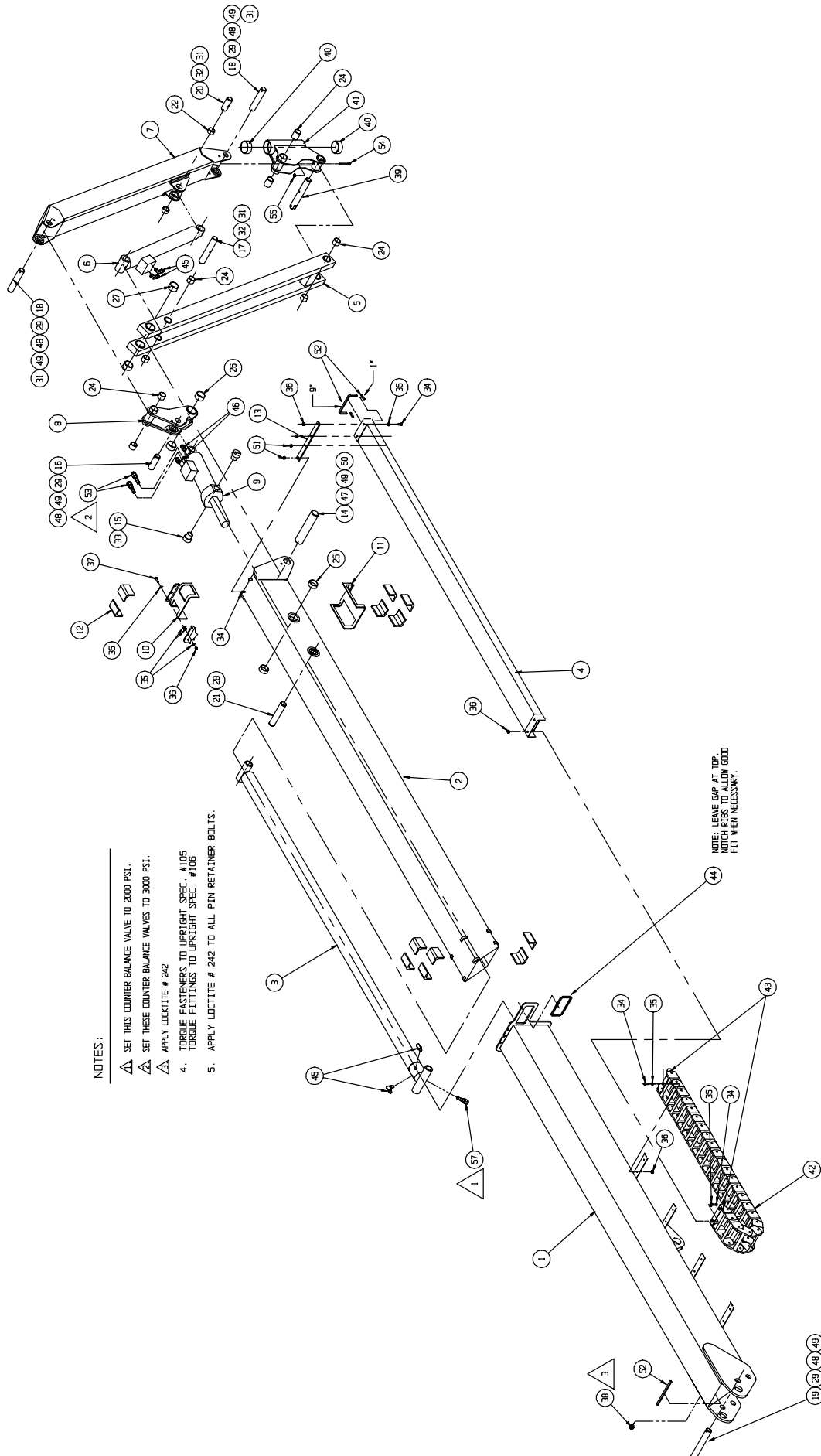
Upper Boom Assembly

068322-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068497-000	TOP (OUTER) BOOM WELDMENT	1
2	068496-000	TOP (INNER) BOOM WELDMENT	1
3	068452-000	BOOM EXTEND CYLINDER	1
*	068452-010	SEAL KIT	
4	068479-000	EXTENSION TUBE WELDMENT	1
5	068447-000	LEVELING TUBE WELDMENT	1
6	068453-001	JIB CYLINDER	1
*	068453-010	SEAL KIT	1
7	068439-000	JIB BOOM WELDMENT	1
8	068438-000	SWINGING FRAME WELDMENT	1
9	068455-000	SLAVE CYLINDER	1
*	068455-010	SEAL KIT	1
10	068436-000	UPPER BEARING PAD CASSETTE	1
11	068435-000	LOWER BEARING PAD CASSETTE	1
12	068423-000	WEAR PAD	12
13	068492-000	EXT. TUBE MTG. BRACKET	1
14	068477-006	PIN, JIB ASSY. PIVOT	1
15	068473-000	PIN, SLAVE CYL. TRUNNION	2
16	068476-005	PIN, SLAVE CYL. ROD END	1
17	068476-006	PIN, JIB CYL. BASE	1
18	068476-003	PIN, BOOM PIVOT	2
19	068476-002	PIN, TELESCOPIC CYL. BASE	1
20	068476-004	PIN, JIB CYL. ROD END	1
21	068474-000	PIN, TELESCOPIC CYL. ROD END	1
22	062642-024	BUSHING, Ø 1.25 X.75 (20DU12)	2
24	062642-025	BUSHING, Ø 1.25 X 1.75 (20DU28)	8
25	062642-027	BUSHING, Ø 1.75 X .75 (28DU12)	2
26	062642-031	BUSHING, Ø 1.75 X 1.50 (28DU24)	2
27	062642-029	BUSHING, Ø 1.75 X 1.75 (28DU28)	2
28	011764-120	RETAINING RING, TRUARC #5100-125	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
29	065214-000	ROD END (PIN RETAINER)	4
31	011248-006	LOCKNUT, HEX. 3/8-16 UNC (ESNA)	4
32	011254-020	SCR, HHC 3/8-16 UNC X 2 1/2	2
33	012553-014	SCR, SOC HD. 1/4-20 UNC X 1 3/4	4
34	011822-006	SCR, BUTT. HD. 5/16-18 UNC X 3/4	8
35	014996-005	WASHER, FLAT 5/16 S.A.E.	30
36	011248-005	LOCKNUT, HEX. 5/16-18 UNC (ESNA)	12
37	011253-010	SCR, HHC. 5/16-18 X 1 1/4	6
38	062881-000	SWITCH, BALL DETENT	1
39	068508-000	PIN, LOWER	1
40	062642-040	BUSHING, Ø 2.50 X 1.00 (40DU16)	2
41	068470-001	PIVOT BRACKET WELDMENT	1
42	068691-022	CAT TRACK (22 LINKS)	1
43	REF.	MOUNTING BRACKET (SET)	1
44	068701-099	WEAR STRIP, POLYETHYLENE	1.33 FT
45	011934-003	FITTING 6-4	4
46	011941-001	FITTING 6-4	2
47	065214-001	ROD END	1
48	011254-010	SCREW HHC 3/8-16UNC X 1 1/4	4
49	011238-006	WASHER, 3/8 SPLIT LOCK	5
50	011254-008	SCREW, HHC 3/8-16UNC X 1	1
51	011246-005	NUT, HEX ESNA 5/16-18UNC	2
52	061692-099	GROMMET (EDGE COVER)	A/R
53	068778-013	VALVE, COUNTER BALANCE 3000 PSI	2
54	011253-020	SCREW HHC 5/16-18 X 2 1/2	1
55	011248-005	NUT HEX ESNA 5/16-18UNC	1
57	068778-012	VALVE, COUNTER BALANCE 2000 PSI	1

* Not shown

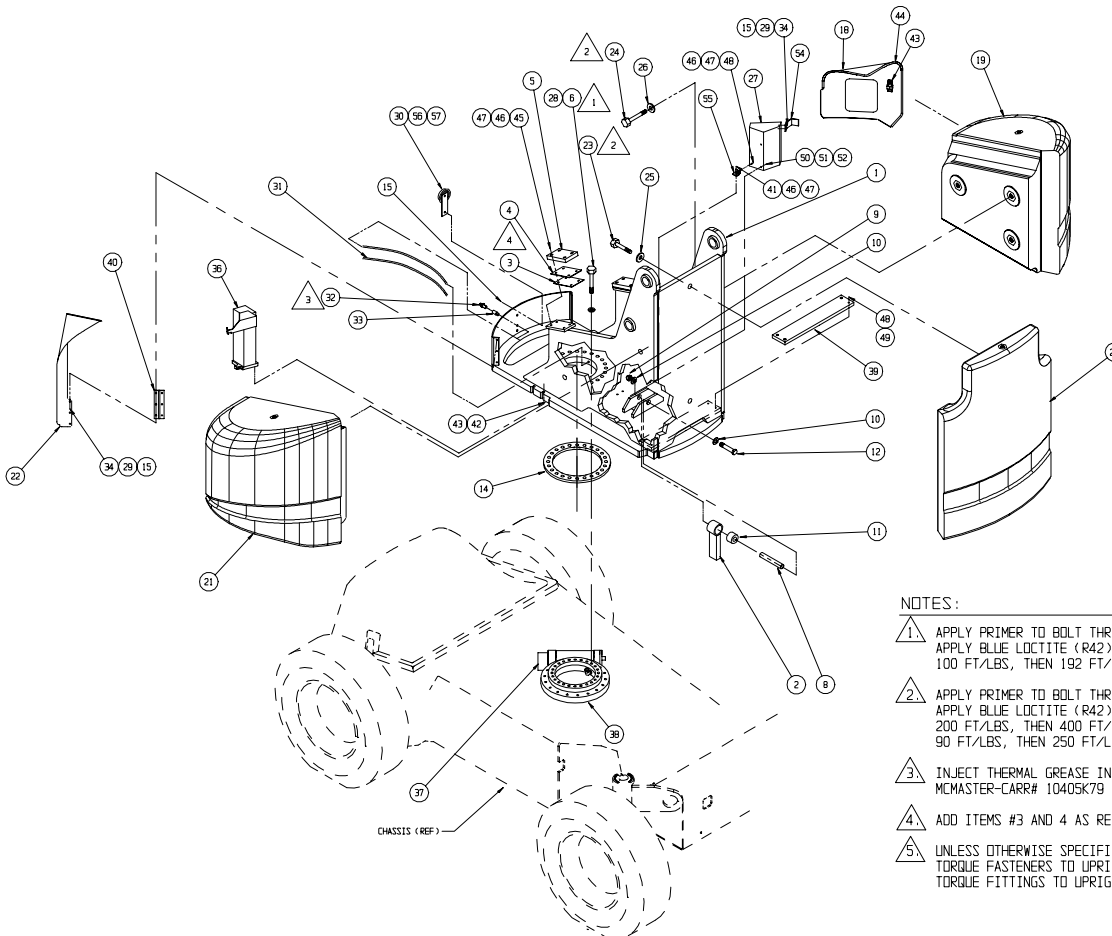


Turret Assembly, Gas

068330-004

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068392-000	TURRET POST WELDMENT	1
2	068485-000	STOP WELDMENT	1
3	068319-000	SHIM, 16GA, REST PAD	A/R
4	068319-001	SHIM, 10GA, REST PAD	A/R
5	068660-000	REST PAD	2
6	011291-040	SCREW, HHC 5/8-11 X 4 GR 8	24
8	068478-000	TUBE, STL 1" O.D. X .120W X 3.10" LG	1
9	011248-012	NUT, HEX ESNA 3/4-10 ESNA	1
10	011240-012	WASHER 3/4 STL	2
11	068720-002	NEOPRENE SPRING CYLINDER-POLY.	1
12	014099-036	SCREW, HHC 3/4-10 X 4-1/2	1
14	019930-220	SPACER RING	2
15	011248-004	NUT, HEX ESNA 1/4-20	14
18	068656-000	COVER TRIM, GROUND CONTROL	1
19	068653-000	COUNTER WEIGHT, LEFT SIDE	1
20	068652-000	COUNTER WEIGHT, REAR	1
21	068654-000	COUNTER WEIGHT, RIGHT SIDE	1
22	068657-000	COVER TRIM, VALVE BLOCK	1
23	014099-012	SCREW HHC, 3/4-10UNC X 1-1/2	2
24	014918-020	SCREW HHC, 1-8UNC X 2-1/2	6
25	011239-012	WASHER FLAT ASTM 3/4" A325	2
26	011240-016	WASHER FLAT 1" STD	6
27	068328-006	LOWER CONTROL BOX-GAS RT	1
28	011297-010	BELLEVILLE WASHER 5/8 DIA	24
29	011240-004	WASHER, 1/4 FLAT STD	16
30	029958-001	HORN, 12 VOLT	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
31	068678-024	TUBING, POLYURETHANE 24"	2
32	013336-001	FITTING, GREASE	2
33	068679-003	FITTING, BULKHEAD	2
34	011252-006	SCREW, HHC 1/4-20 X 3/4	14
36	068348-002	VALVE BLOCK ASSY-I/C RT	1
37	068575-000	MOTOR, WHITE HYD	REF
38	068571-000	DRIVE WORM GEAR	REF
39	068660-001	REST PAD	A/R
40	068759-000	HINGE, TURRET COVER	2
41	011253-018	SCRW HHC GR5 5/16-18 X 2 1/4	1
42	011253-022	SCRW HHC GR5 5/16-18 X 2-3/4	2
43	068757-002	LATCH, SOUTHCO	2
44	061692-099	GROMMET MATERIAL	10 FT
45	011253-012	SCRW HHC GR5 5/16-18 X 1-1/2	8
46	011248-005	NUT HEX 5/16-18 ESNA	12
47	014996-005	WASHER 5/16 FLAT SAE	16
48	011253-006	SCRW HHC GR5 5/16-18 X 3/4	5
49	011238-005	WASHER, SPLIT LOCK 5/16	4
50	011254-006	SCRW HHC GR5 3/8-16 UNC X 3/4	2
51	011238-006	WASHER, SPLIT LOCK 3/8	2
52	014996-006	WASHER, 3/8 FLAT SAE	2
54	068792-000	BRACKET	1
55	068793-000	BRACKET	1
56	011248-006	NUT 3/8-UNC ESNA	1
57	011254-010	SCREW HHC GR5 3/8-UNC X 1 1/4	1



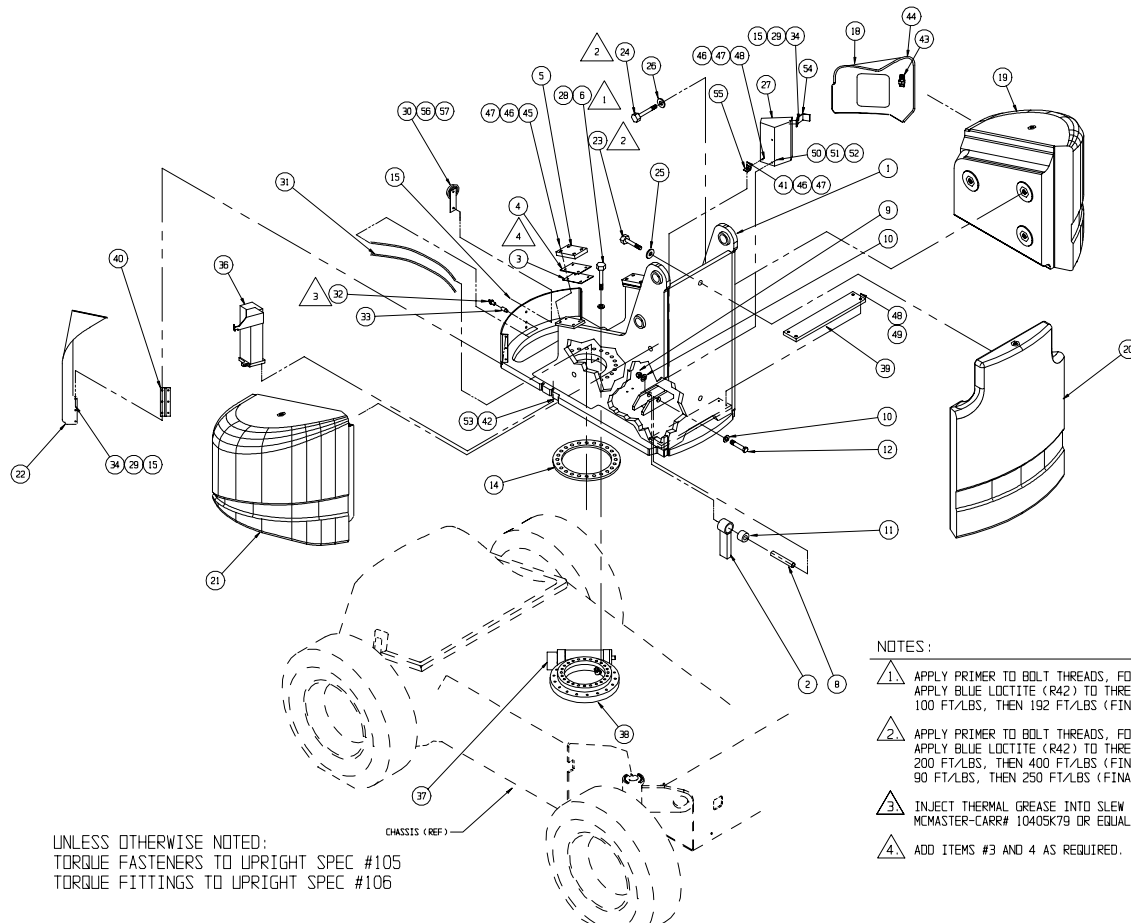
NOTES:

1. APPLY PRIMER TO BOLT THREADS, FOLLOWING INSTRUCTIONS. APPLY BLUE LOCTITE (R42) TO THREADS AND TORQUE TO 100 FT/LBS, THEN 192 FT/LBS (FINAL).
2. APPLY PRIMER TO BOLT THREADS, FOLLOWING INSTRUCTIONS. APPLY BLUE LOCTITE (R42) TO THREADS AND TORQUE TO 200 FT/LBS, THEN 400 FT/LBS (FINAL) FOR 1" BOLTS; 90 FT/LBS, THEN 250 FT/LBS (FINAL) FOR 3/4" BOLTS.
3. INJECT THERMAL GREASE INTO SLEW RING VIA GREASE FITTINGS. MCMASTER-CARR# 10405K79 OR EQUAL.
4. ADD ITEMS #3 AND 4 AS REQUIRED.
5. UNLESS OTHERWISE SPECIFIED: TORQUE FASTENERS TO UPRIGHT SPEC. #105 TORQUE FITTINGS TO UPRIGHT SPEC. #106

Turret Assembly, Diesel

068330-005

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068392-000	TURRET POST WELDMENT	1	31	068678-024	TUBING, POLYURETHANE 24"	2
2	068485-000	STOP WELDMENT	1	32	013336-001	FITTING, GREASE	2
3	068319-000	SHIM, 16GA, REST PAD	A/R	33	068679-003	FITTING, BULKHEAD	2
4	068319-001	SHIM, 10GA, REST PAD	A/R	34	011252-006	SCREW, HHC 1/4-20 X 3/4	14
5	068660-000	REST PAD	2	36	068348-002	VALVE BLOCK ASSY-I/C RT	1
6	011291-040	SCREW, HHC 5/8-11 X 5 GR 8	24	37	068575-000	MOTOR, WHITE HYD	REF
8	068478-000	TUBE, STL 1" O.D. X .120W X 3.10" LG	1	38	REF	DRIVE WORM GEAR (68571)	REF
9	011248-012	NUT, HEX ESNA 3/4-10 ESNA	1	39	068660-001	REST PAD	A/R
10	011240-012	WASHER 3/4 STL	2	40	068759-000	HINGE, TURRET COVER	2
11	068720-002	NEOPRENE SPRING CYLINDER-POLY.	1	41	011253-018	SCRW HHC GR5 5/16-18 X 2 1/4	1
12	014099-036	SCREW, HHC 3/4-10 X 4-1/2	1	42	011253-022	SCRW HHC GR5 5/16-18 X 2-3/4	2
14	019930-220	SPACER RING	2	43	068757-002	LATCH, SOUTHCO	2
15	011248-004	NUT, HEX ESNA 1/4-20	14	44	061692-099	GROMMET MATERIAL	10 FT
18	068656-000	COVER TRIM, GROUND CONTROL	1	45	011253-012	SCRW HHC GR5 5/16-18 X 1-1/2	8
19	068653-000	COUNTER WEIGHT, LEFT SIDE	1	46	011248-005	NUT HEX 5/16-18 ESNA	12
20	068652-000	COUNTER WEIGHT, REAR	1	47	014996-005	WASHER 5/16 FLAT SAE	16
21	068654-000	COUNTER WEIGHT, RIGHT SIDE	1	48	011253-006	SCRW HHC GR5 5/16-18 X 3/4	5
22	068657-000	COVER TRIM, VALVE BLOCK	1	49	011238-005	WASHER, SPLIT LOCK 5/16	4
23	014099-012	SCREW HHC, 3/4-10UNC X 1-1/2	2	50	011254-006	SCRW HHC GR5 3/8-16 UNC X 3/4	2
24	014918-020	SCREW HHC, 1-8UNC X 2-1/2	6	51	011238-006	WASHER, SPLIT LOCK 3/8	2
25	011239-012	WASHER FLAT ASTM 3/4" A325	2	52	014996-006	WASHER, 3/8 FLAT SAE	2
26	011240-016	WASHER FLAT 1" STD	6	54	068792-000	BRACKET	1
27	068328-005	LOWER CONTROL BOX-DIESEL RT	1	55	068793-000	BRACKET	1
28	011297-010	BELLEVILLE WASHER 5/8 DIA	24	56	011248-006	NUT 3/8-UNC ESNA	1
29	011240-004	WASHER, 1/4 FLAT STD	16	57	11254-010	SCREW HHC GR5 3/8-UNC X X1 1/4	1
30	029958-001	HORN, 12 VOLT	1				



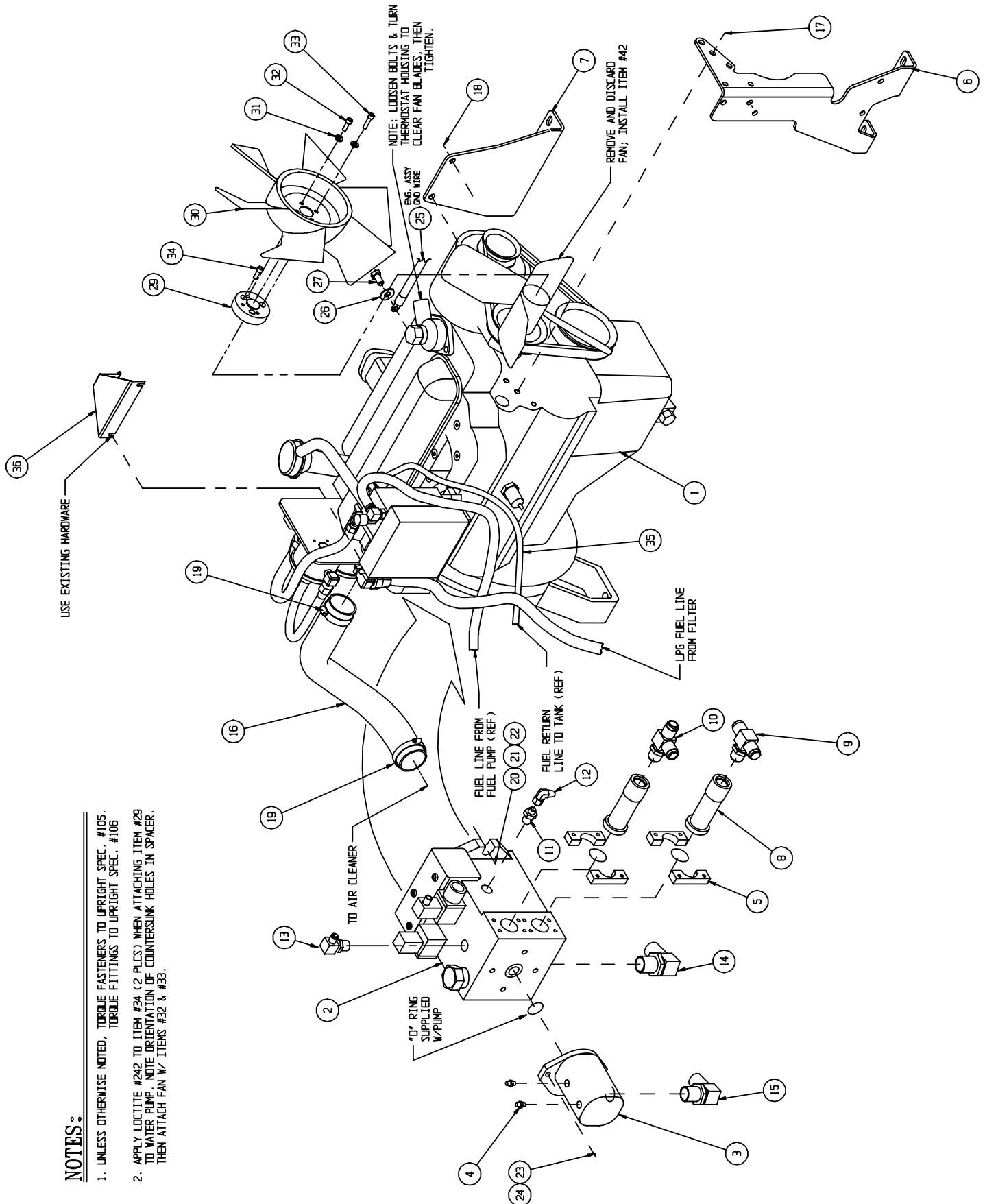
Engine Assembly, Ford Dual Fuel

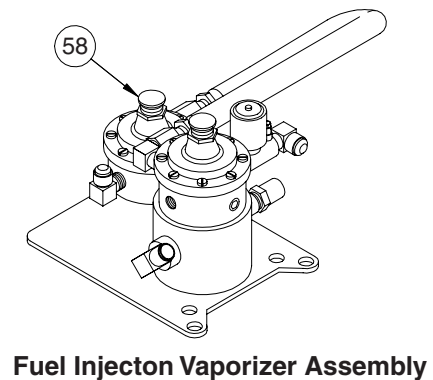
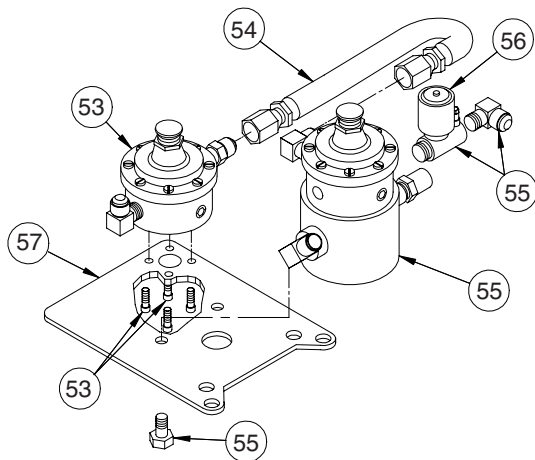
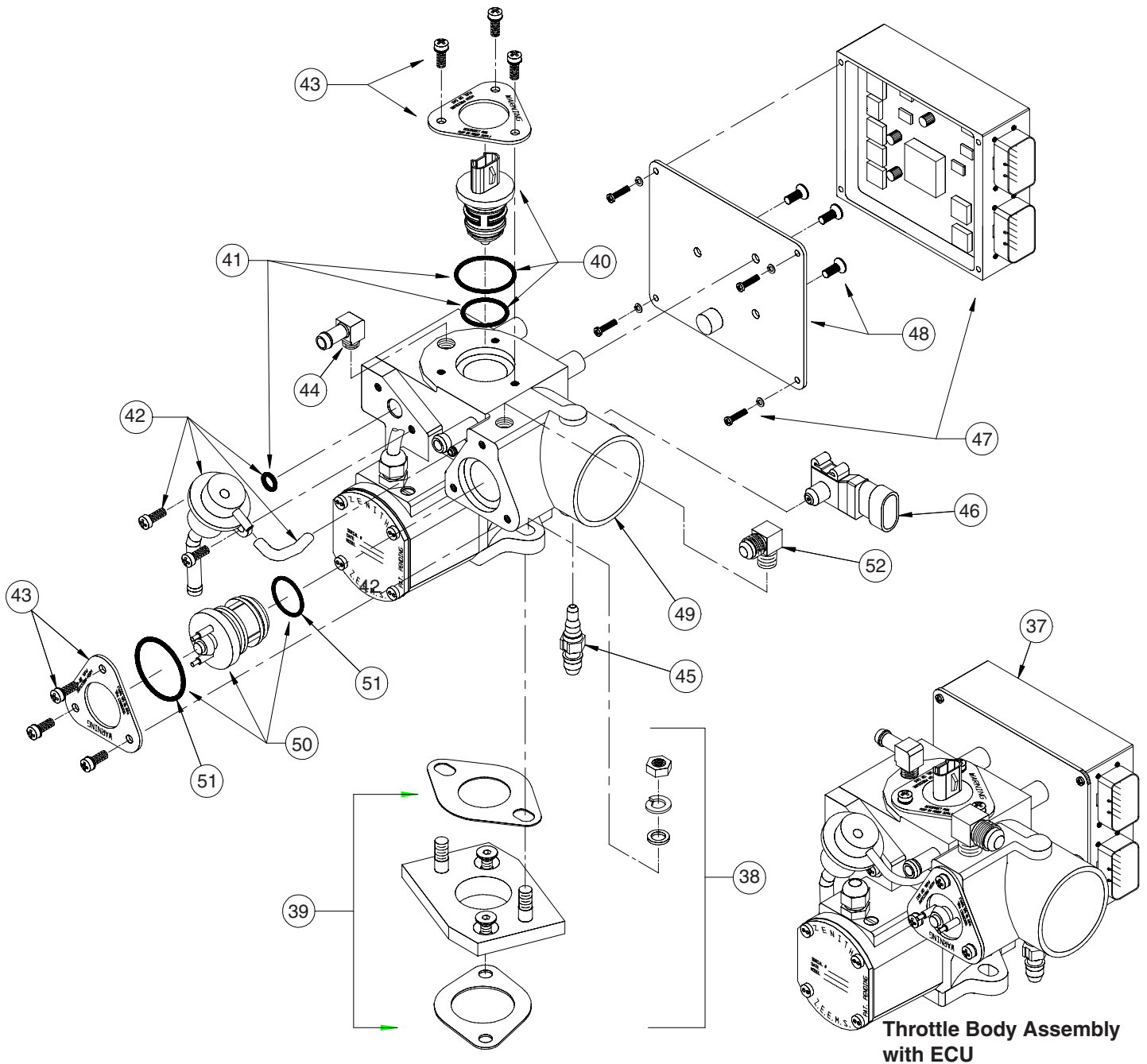
068871-001

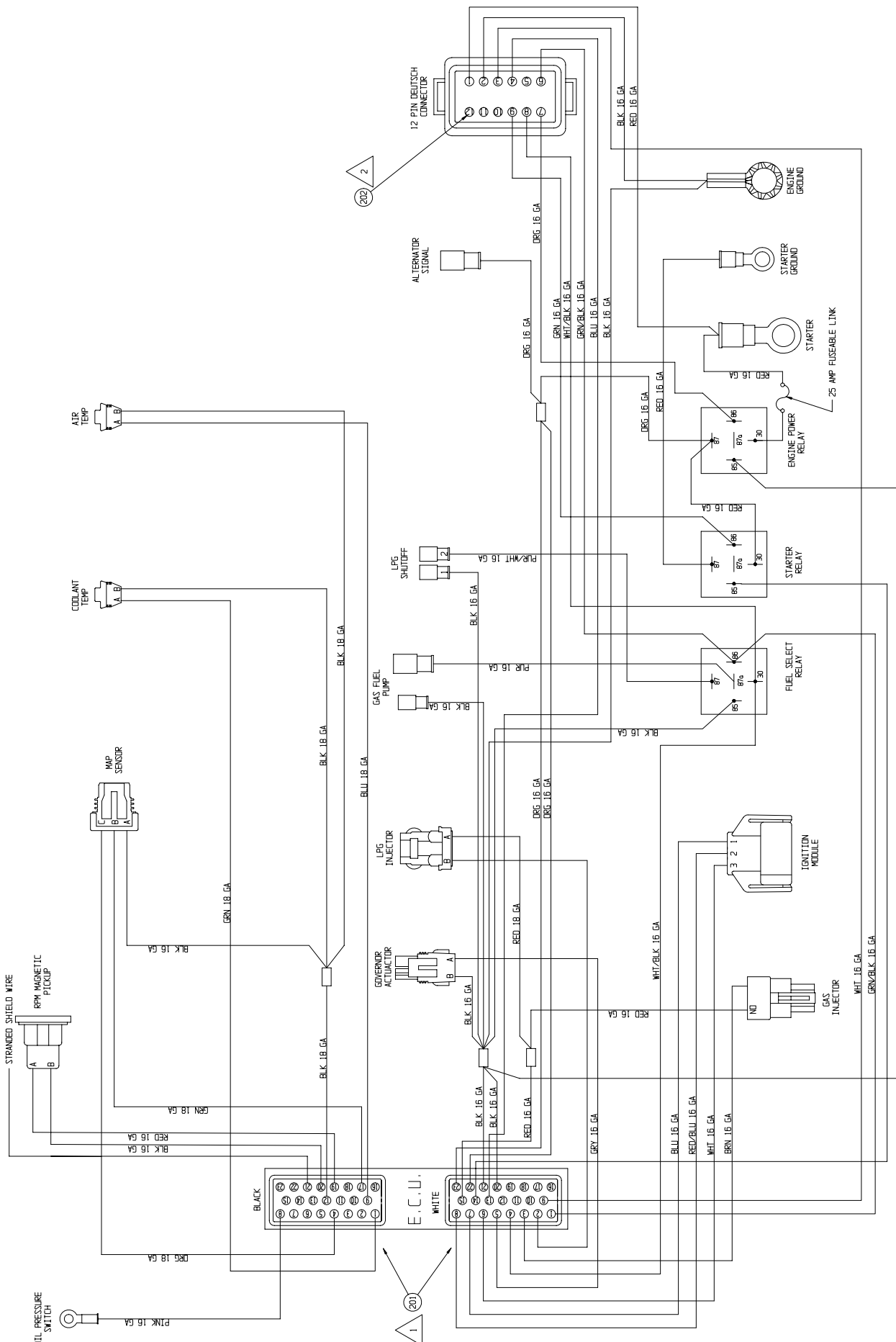
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109051-000	ENGINE, FORD GAS (EFI)	1
*	068873-003	OIL FILTER	1
*	068873-004	FUEL FILTER	1
*	068873-005	FAN BELT	1
*	068873-007	STARTER	1
*	068873-008	STARTER SOLENOID	1
*	068873-009	ALTERNATOR	1
*	068873-010	ALTERNATOR BRACKET	1
*	068873-011	WATER PUMP	1
*	068873-012	WATER PUMP GASKET	1
*	068873-013	WATER HOSE	1
*	068873-014	WATER HOSE CLAMP	1
*	068873-015	THERMOSTAT	1
*	068873-016	THERMOSTAT HOUSING GASKET	1
*	068873-017	SPARK PLUG	1
*	068873-018	SPARK PLUG WIRE	1
*	068873-019	SPARK PLUG WIRE CAP	1
*	068873-021	DISTRIBUTOR CAP	1
*	068873-022	DISTRIBUTOR ROTOR	1
*	068873-025	OIL DRAIN PLUG	1
*	068873-026	OIL DRAIN PLUG CRUSH WASHER	1
*	068873-027	INTAKE MANIFOLD GASKET	1
*	068873-028	EXHAUST MANIFOLD GASKET	1
*	068873-029	EXHAUST MANIFOLD BOLTS	1
*	068873-030	HEAD GASKET	1
*	068873-031	VALVE COVER GASKET	1
*	068873-033	FLYWHEEL RING GEAR	1
2	068883-000	PUMP, REXROTH	1
3	068669-000	PUMP, BARNES	1
4	068779-000	VALVE, CHECK	2
5	068812-000	KIT, SPLIT FLANGE ADAPTER	2
6	068910-000	BRACKET, MOUNTING	1
7	068861-000	BRACKET, MOUNTING	1
8	068950-000	ADAPTER, #10 SPLT FLNG/#10 JIC	2
9	011936-005	FITTING, TEE 10MB-10MJ-10MJ	1
10	015961-010	FITTING, TEE 10MJ-10MB-10MJ	1
11	011941-015	FITTING, 10MB-10MJ	1
12	011937-006	FITTING, 90° 10FJX-10MJ	1
13	011934-027	FITTING, 90° 8MB-4MJ	1
14	011934-019	FITTING, 90° 16MB-16MJ	1
15	011934-012	FITTING, 90° 10MB-12MJ	1
16	068892-002	HOSE, FORD EFI INTAKE	1
17	063946-016	SCREW, HHC. M10-1.5 X 16MM LG.	3
18	063946-020	SCREW, HHC. M10-1.5 X 20MM LG.	2
19	020541-020	CLAMP, HOSE (2-1/8 - 3)	2
20	011256-010	SCREW, HHC 1/2-13 UNC X 1-1/4	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
21	011238-004	WASHER, 1/2" SPLIT LOCK	2
22	011239-008	WASHER, 1/2" FLAT	2
23	011238-006	WASHER, 3/8" SPLIT LOCK	2
24	011254-008	SCREW, HHC 3/8-16 UNC X 1	2
25	061254-002	CABLE ASSEMBLY (18" LG)	1
26	014996-008	WASHER, 1/2" FLAT	1
27	063946-020	SCREW, HHC M10-1.5 X 20MM LG	1
29	068988-000	MOUNT, FAN	1
30	068996-000	FAN, PUSHER (JOHN DEERE)	1
31	011240-003	WASHER, #10 FLAT	2
32	066488-014	SCREW, SCKT HD M6X1.0 X 14MM	3
33	066488-025	SCREW, SCKT HD M6X1.0 X 25MM	1
34	066488-018	SCREW, SCKT HD M6X1.0 X 18MM	2
35	012733-099	HOSE, FUEL Ø5/16	5 FT
36	109051-010	COVER - FUEL INJECTOR	1
37	109051-015	THROTTLE BODY ASSY W/ECU	1
38	109051-016	MANIFOLD ADAPTER KIT	1
39	109051-017	MANIFOLD GASKET KIT	1
40	109051-018	GAS INJECTOR W/TOP & BOTTOM O-RINGS	1
41	109051-019	INJECTOR & PRESSURE REGULATOR O-RINGS	1
42	109051-020	GAS PRESSURE REGULATOR W/O-RING, HOSE & SCREWS	1
43	109051-021	INJECTOR MOUNTING PLATE & SCREWS	1
44	109051-022	GASOLINE FUEL INLET	1
45	109051-023	AIR OR COOLANT TEMPERATURE SENSOR	1
46	109051-025	MANIFOLD ABSOLUTE PRESSURE SENSOR	1
47	109051-026	ECU FOR DUAL FUEL W/SCREWS & CLAMPS	1
48	109051-027	ECU MOUNTING PLATE & SCREWS	1
49	109051-028	THROTTLE BODY W/INTEGRAL GOVERNOR ACTUATOR	1
50	109051-029	LIQUID PETROLIUM GAS INJECTOR W/2 O-RINGS	1
51	109051-030	LPG INJECTOR TOP & BOTTOM O-RINGS	1
52	109051-031	LPG THROTTLE BODY FUEL INLET	1
*	109051-011	GAS FUEL PUMP	1
*	109051-012	GAS FUEL FILTER W/HOSE CLAMPS	1
*	109051-013	LPG FUEL FILTER	1
53	109051-033	SECONDARY LP REGULATOR ASSY W/ 4 SCREWS	1
54	109051-035	LP HOSE ASSY - PRIMARY TO SECONDARY	1
55	109051-034	PRIMARY LP REGULATOR ASSY W/ 2 SCREWS	1
56	109051-036	LP LOCK OFF	1
57	109051-037	VAPORIZER BRACKET	1
58	109051-032	FUEL INJECTION VAPORIZER ASSEMBLY	1
201	109051-014	WIRE HARNESS, EFI GAS	REF
202	068764-000	PLUG, SEALING 16 GA	4

* Not shown







Engine Assembly, Nissan Dual Fuel

109131-000

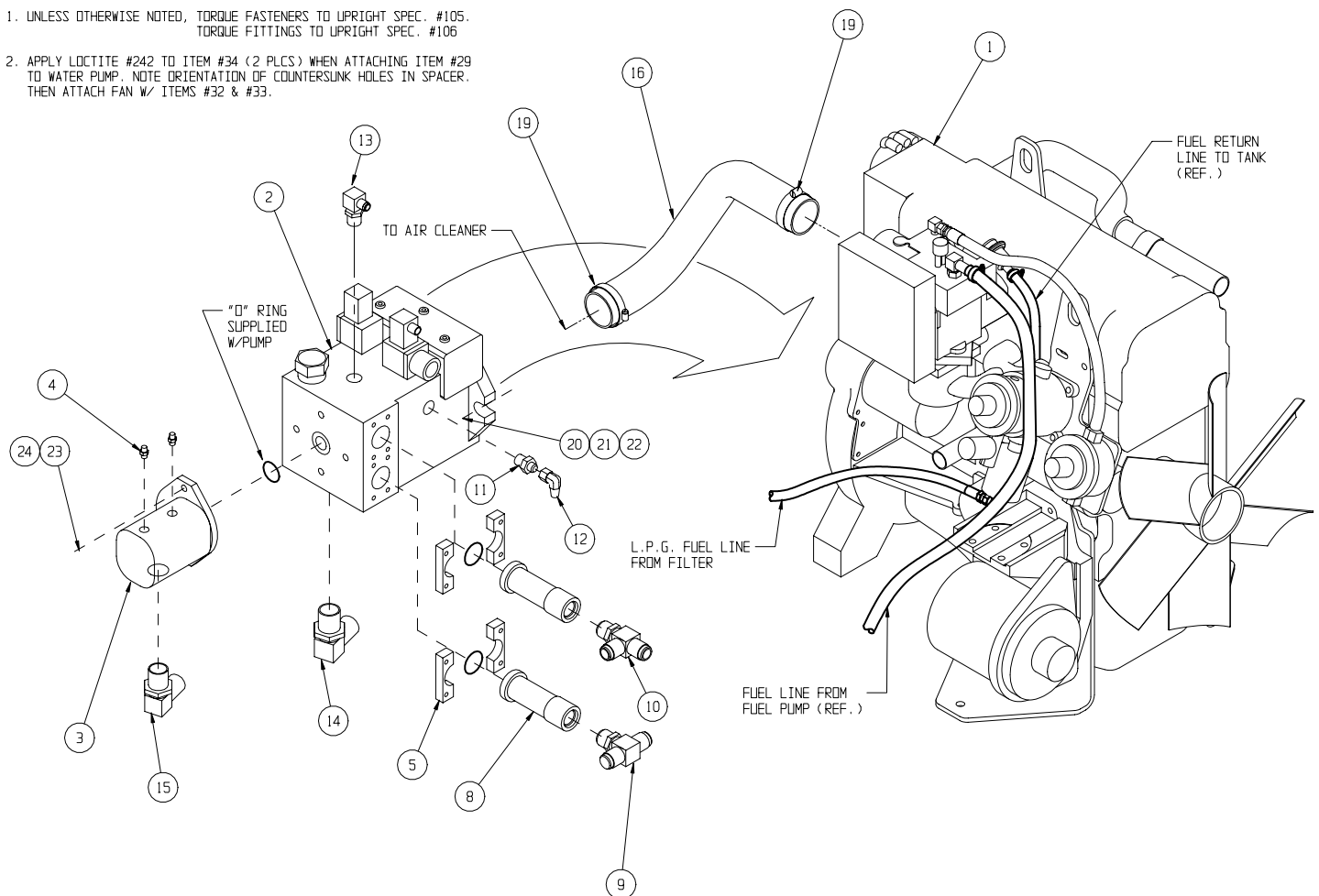
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY
1	109150-000	ENGINE, NISSAN	1
2	068883-002	PUMP	1
3	068669-000	PUMP	1
4	068779-000	VALVE, CHECK	2
5	068812-000	KIT, SPLIT FLANGE ADAPTER	2
8	068950-000	ADAPTER, #10 SPLT FLNG/#10 JIC	2
9	011936-005	FITTING, TEE 10MB-10MJ-10MJ	1
10	015961-010	FITTING, TEE 10MJ-10MB-10MJ	1
11	011941-015	FITTING, 10MB-10MJ	1
12	011937-006	FITTING, 90 10FJX-10MJ	1
13	011934-027	FITTING, 90 8MB-4MJ	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY
14	011934-019	FITTING, 90 16MB-16MJ	1
15	011934-012	FITTING, 90 10MB-12MJ	1
16	068892-003	HOSE, AIR INLET	1
19	020541-020	CLAMP, HOSE (2-1/8 - 3)	2
20	011256-010	SCREW, HHC 1/2-13 UNC X 1-1/4	2
21	011238-004	WASHER, 1/2" SPLIT LOCK	2
22	011239-008	WASHER, 1/2" FLAT	2
23	011238-006	WASHER, 3/8" SPLIT LOCK	2
24	011254-008	SCREW, HHC 3/8-16 UNC X 1	2

NOTES:

1. UNLESS OTHERWISE NOTED, TORQUE FASTENERS TO UPRIGHT SPEC. #105.
TORQUE FITTINGS TO UPRIGHT SPEC. #106

2. APPLY LOCTITE #242 TO ITEM #34 (2 PLCS) WHEN ATTACHING ITEM #29
TO WATER PUMP. NOTE ORIENTATION OF COUNTERSUNK HOLES IN SPACER.
THEN ATTACH FAN W/ ITEMS #32 & #33.

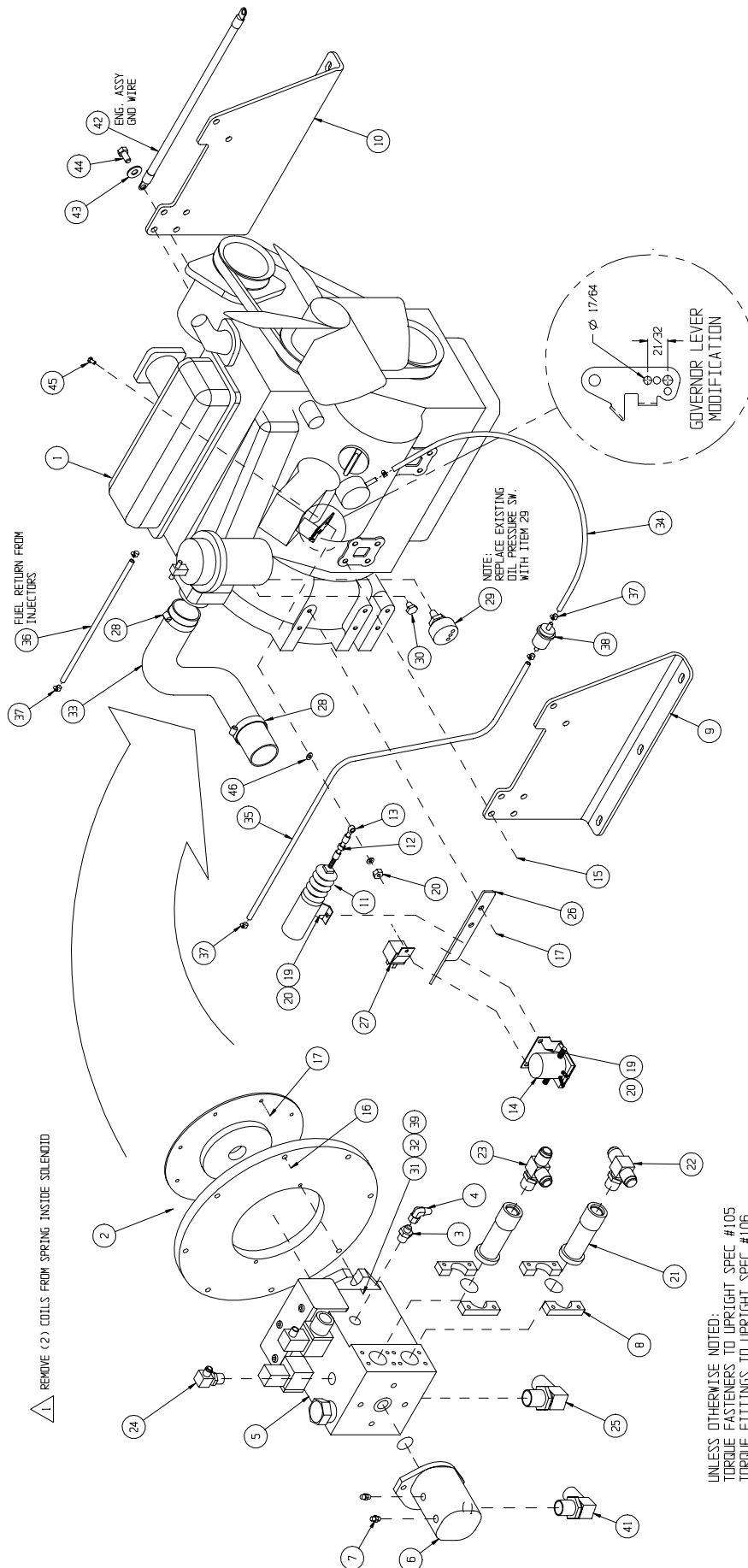


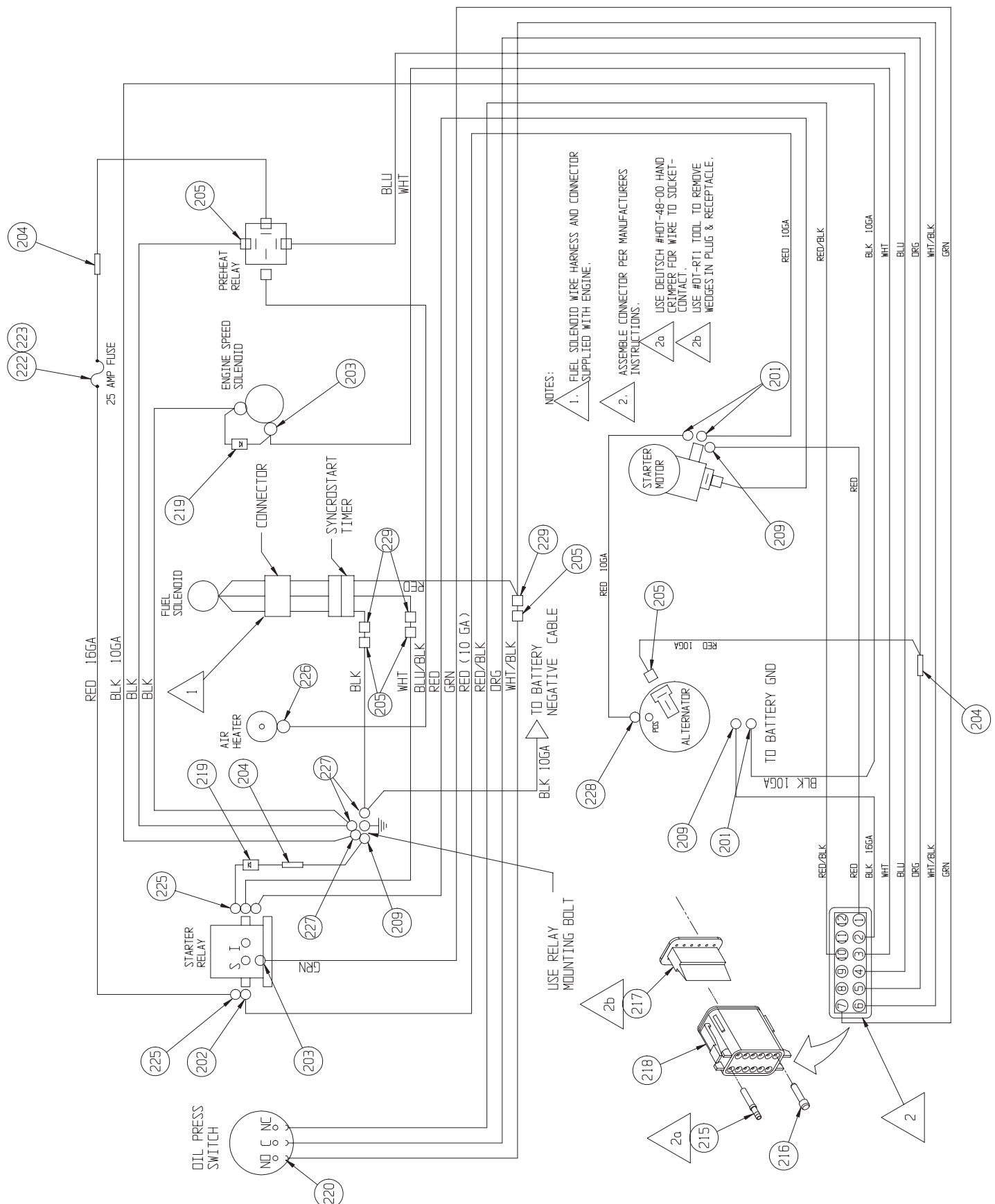
Engine Assembly, John Deere Diesel

068872-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY
1	068874-000	ENGINE, JOHN DEERE DIESEL	1	25	011934-019	FITTING, 90° 16MB-16MJ	1
*	068874-001	STARTER	1	26	068911-000	BRACKET, SOLENOID	1
*	068874-002	GOVERNOR ASSEMBLY	1	27	068132-001	SWITCH, AUTO RELAY	1
*	068874-003	OIL FILTER	1	28	020541-018	HOSE CLAMP	2
*	068874-004	FUEL FILTER	1	29	068954-001	OIL PRESSURE SWITCH	1
*	068874-005	FAN BELT	1	30	011919-002	PIPE PLUG, 1/4 NPT	1
*	068874-006	IGNITION MODULE	1	31	011256-010	SCR, HHC. 1/2-13UNC X 1 1/4 LG.	2
*	068874-007	INJECTOR	1	32	011238-004	WASHER, SPLIT LOCK 1/2"	2
*	068874-008	INJECTION LINE	1	33	068891-000	HOSE, INLET	1
*	068874-009	STARTER SOLENOID	1	34	012733-099	HOSE, FUEL LINE 5/16 ID	FT 1
*	068874-010	ALTERNATOR	1	35	012733-099	HOSE, FUEL LINE 5/16 ID	FT 3
*	068874-011	ALTERNATOR BRACKET	1	36	012736-099	HOSE, FUEL LINE 3/16 ID	FT 3
*	068874-012	WATER PUMP	1	37	020541-001	HOSE CLAMP	6
*	068874-013	WATER PUMP GASKET	1	38	020331-000	FILTER, IN-LINE FUEL	1
*	068874-014	WATER HOSE	1	39	011239-008	WASHER FLAT ASTM A325 1/2	2
*	068874-015	WATER HOSE CLAMP	1	41	011934-012	FITTING 10-12S 90 DEG	1
*	068874-016	THERMOSTAT	1	42	061254-002	CABLE ASSEMBLY (18" LG)	1
*	068874-017	THERMOSTAT HOUSING GASKET	1	43	014996-006	WASHER, 3/8 SAE FLAT PLATED	1
*	068874-018	SPARK PLUG	1	44	063946-020	SCREW, HHC M10-1.5 X 20MM LG	1
*	068874-019	SPARK PLUG WIRE	1	45	011252-008	SCREW HHC GR5 1/4-UNC X 1	1
*	068874-020	SPARK PLUG WIRE CAP	1	46	011240-004	WASHER, FLAT 1/4	2
*	068874-021	DISTRIBUTOR CAP	1	201	029601-021	CONN RING 12-10 GA 3/8 DIA	3
*	068874-022	DISTRIBUTOR ROTOR	1	202	029601-039	CONN RING 12-10 GA. 5/16	1
*	068874-023	THROTTLE LINKAGE	1	203	029601-013	CONN RING 16-14 GA. # 10	5
*	068874-024	OIL DRAIN PLUG	1	204	029620-002	BUTT CONNECTOR 14-16 GA.	3
*	068874-025	OIL DRAIN PLUG CRUSH WASHER	1	205	029931-003	CONN FEMALE PUSH 16-14 GA. 1/4	8
*	068874-026	INTAKE MANIFOLD GASKET	1	206	029478-099	WIRE 16 AWG RED/BLK	FT. 6
*	068874-027	EXHAUST MANIFOLD GASKET	1	207	029453-099	WIRE 16 AWG ORG	FT. 6
*	068874-028	EXHAUST MANIFOLD BOLTS	1	208	029480-099	WIRE 10 AWG RED	FT. 7
*	068874-029	HEAD GASKET	1	209	029601-015	CONN RING 16-14 GA 3/8 DIA	3
*	068874-030	VALVE COVER GASKET	1	210	029451-099	WIRE 16 AWG WHT	FT 7
2	068876-000	PUMP ADAPTOR KIT	1	211	029452-099	WIRE 16 AWG BLK	FT 10
3	011941-015	FITTING, 10MB-10MJ	1	212	029457-099	WIRE 16 AWG GRN	FT. 6
4	011937-006	FITTING, 90° 10FJX-10MJ	1	213	029479-099	WIRE 16 AWG WHT/BLK	FT. 6
5	068883-002	PUMP	1	214	029450-099	WIRE 16 AWG BLU	FT. 6
6	068669-000	PUMP	1	215	068762-001	SOCKET - CONTACT	8
7	068779-000	CHECK VALVE,	2	216	068764-000	PLUG - SEALING 12-14 GA.	4
8	068812-000	ADAPTER KIT, SPLIT FLANGE	2	217	068761-001	LOCK WEDGE - PLUG	1
9	068862-001	ENGINE MOUNTING PLATE	1	218	068760-000	PLUG - CONNECTOR	1
10	068862-002	ENGINE MOUNTING PLATE	1	219	029825-002	DIODE 5A 400V	2
11	063941-000	SOLENOID, THROTTLE	1	220	029610-002	CONN FORK 16-14 AWG #8	3
12	064423-000	SWIVEL, INLINE	1	221	029481-099	WIRE 10 AWG BLK	FT 6
13	011760-004	ROD END BEARING	1	222	029702-000	FUSE HOLDER	1
14	027972-000	SOLENOID, STARTER RELAY	1	223	029704-025	FUSE 25 AMP	1
15	063946-020	SCR. HHC. M10-1.5 X 20MM LG.	12	225	029601-040	CONN RING 16-14GA 5/16	4
16	063946-025	SCR. HHC. M10-1.5 X 25MM LG.	8	226	029601-014	CONN RING 16-14GA 1/4	1
17	063961-016	SCR. HHC. M8-1.25 X 16MM LG.	10	227	029601-020	CONN RING 12-10GA 1/4	3
19	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	4	228	029601-019	CONN RING 12-10GA #10	1
20	011248-004	LOCK NUT, 1/4-20UNC ESNA	4	229	029617-002	CONN MALE PUSH 16-14GA 1/4	3
21	068950-000	ADAPTOR, #10 SPLIT FL./#10 J.I.C.	2				
22	011936-005	FITTING, TEE	1				
23	015961-010	FITTING, TEE	1				
24	011934-027	FITTING, 90° 8MB-4MJ	1				

* Not shown



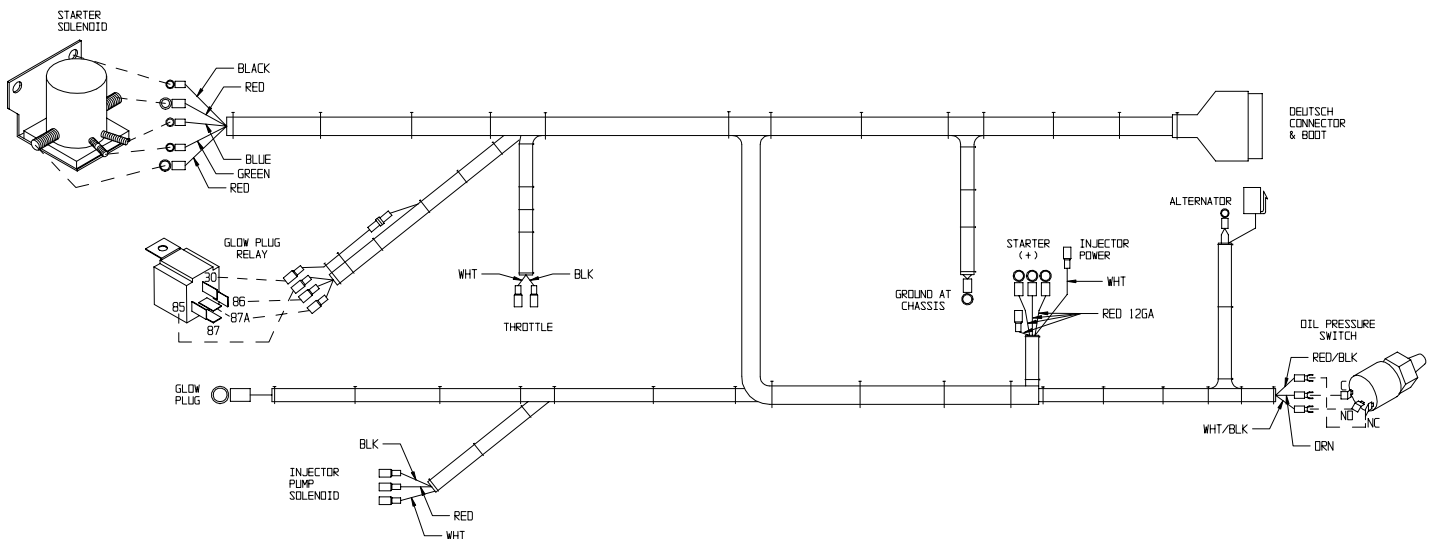


Engine Assembly, Kubota Diesel

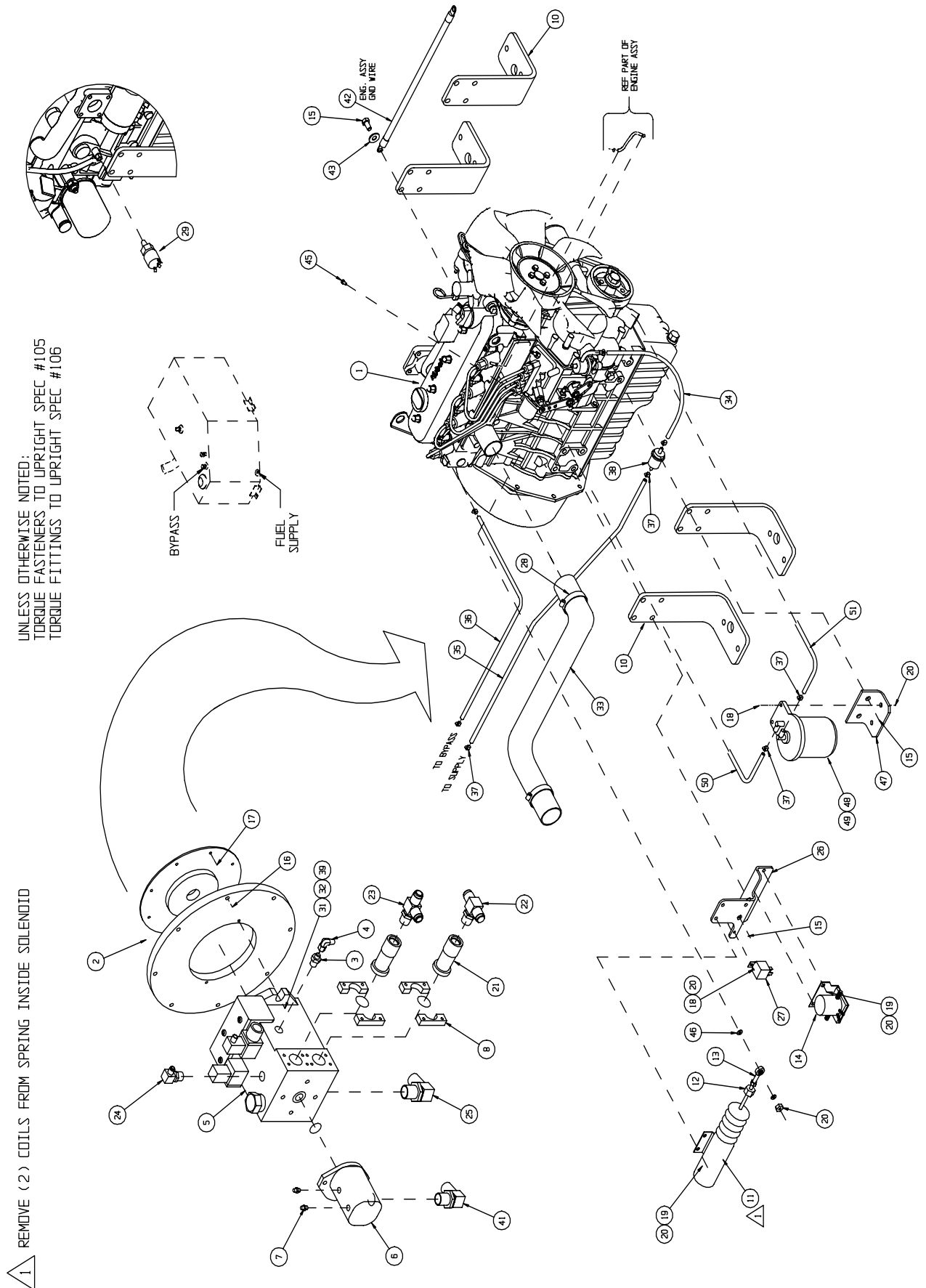
068872-010

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109072-000	ENGINE, KUBOTA DIESEL	1
*	109077-000	HOSE, BOTTOM RADIATOR	1
*	109076-000	HOSE, TOP RADIATOR	1
*	068915-001	MUFFLER	1
*	068903-000	AIR CLEANER	1
*	068887-000	RADIATOR	1
*	067614-006	FUEL FILTER	1
*	067614-019	ALTERNATOR	1
*	067614-026	FUEL PUMP	1
*	067614-004	OIL FILTER	1
*	067614-011	GLOW PLUG	1
*	067614-014	THERMOSTAT	1
*	067614-074	THERMOSTAT GASKET	1
*	067614-052	FUEL FILTER ASSY	1
*	067614-027	STOP SOLENOID	1
*	109072-011	FAN	1
*	109072-014	STARTER	1
*	109072-021	DIPSTICK	1
2	068876-000	PUMP ADAPTOR KIT	1
3	011941-015	FITTING, 10MB-10MJ	1
4	011937-006	FITTING, 90° 10FJX-10MJ	1
5	068883-001	PUMP, REXROTH	1
6	068669-000	PUMP, BARNES	1
7	068779-000	CHECK VALVE,	2
8	068812-000	ADAPTER KIT, SPLIT FLANGE	2
10	109071-000	ENGINE MOUNTING PLATE	4
11	067599-000	SOLENOID, THROTTLE	1
12	064423-000	SWIVEL, INLINE	1
13	011760-004	ROD END BEARING	1
14	027972-000	SOLENOID, STARTER RELAY	1
15	063946-020	SCR. HHC. M10-1.5 X 20MM LG.	12
16	063946-025	SCR. HHC. M10-1.5 X 25MM LG.	8
17	063946-030	SCR. HHC. M10-1.5 X 30MM LG.	16
18	011252-008	SCREW HHC 1/4-20 UNC X 1	3

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
19	011252-006	SCR, HHC. 1/4-20UNC X 3/4 LG.	4
20	011248-004	LOCK NUT, 1/4-20UNC ESNA	7
21	068950-001	ADAPTOR, #10 SPLIT FL./#10 J.I.C.	2
22	011936-005	FITTING, TEE	1
23	015961-010	FITTING, TEE	1
24	011934-027	FITTING, 90° 8MB-4MJ	1
25	011934-019	FITTING, 90° 16MB-16MJ	1
26	109075-000	BRACKET, SOLENOID	1
27	068132-001	SWITCH, AUTO RELAY	1
28	020541-018	HOSE CLAMP	2
29	068954-001	OIL PRESSURE SWITCH	1
31	011256-010	SCR, HHC. 1/2-13UNC X 1 1/4 LG.	2
32	011238-004	WASHER, SPLIT LOCK 1/2"	2
33	109078-000	HOSE, INLET	1
34	012733-099	HOSE, FUEL LINE 5/16 ID	FT 1
35	012733-099	HOSE, FUEL LINE 5/16 ID	FT 3
36	012736-099	HOSE, FUEL LINE 3/16 ID	FT 4
37	020541-001	HOSE CLAMP	10
38	020331-000	FILTER, IN-LINE FUEL	1
39	011239-008	WASHER FLAT ASTM A325 1/2	2
41	011934-012	FITTING 10-12S 90 DEG	1
42	061254-002	CABLE ASSEMBLY (18" LG)	1
43	014996-006	WASHER, 3/8 SAE FLAT PLATED	1
44	063946-020	SCREW, HHC M10-1.5 X 20MM LG	1
45	011252-008	SCREW HHC GR5 1/4-UNC X 1	1
46	011240-004	WASHER, FLAT 1/4	2
47	067870-000	BRACKET, DIESEL FUEL FILTER	1
48	REF	FUEL FILTER MOUNT - SPIN ON	1
49	REF	FUEL FILTER - SPIN ON	1
50	012733-099	HOSE, FUEL LINE 5/16 ID	FT .92
51	012736-099	HOSE, FUEL LINE 3/16 ID	FT 1
201	109080-000	HARNESS ENGINE - KUBOTA DIESEL	1



Drawing # 1 of 2



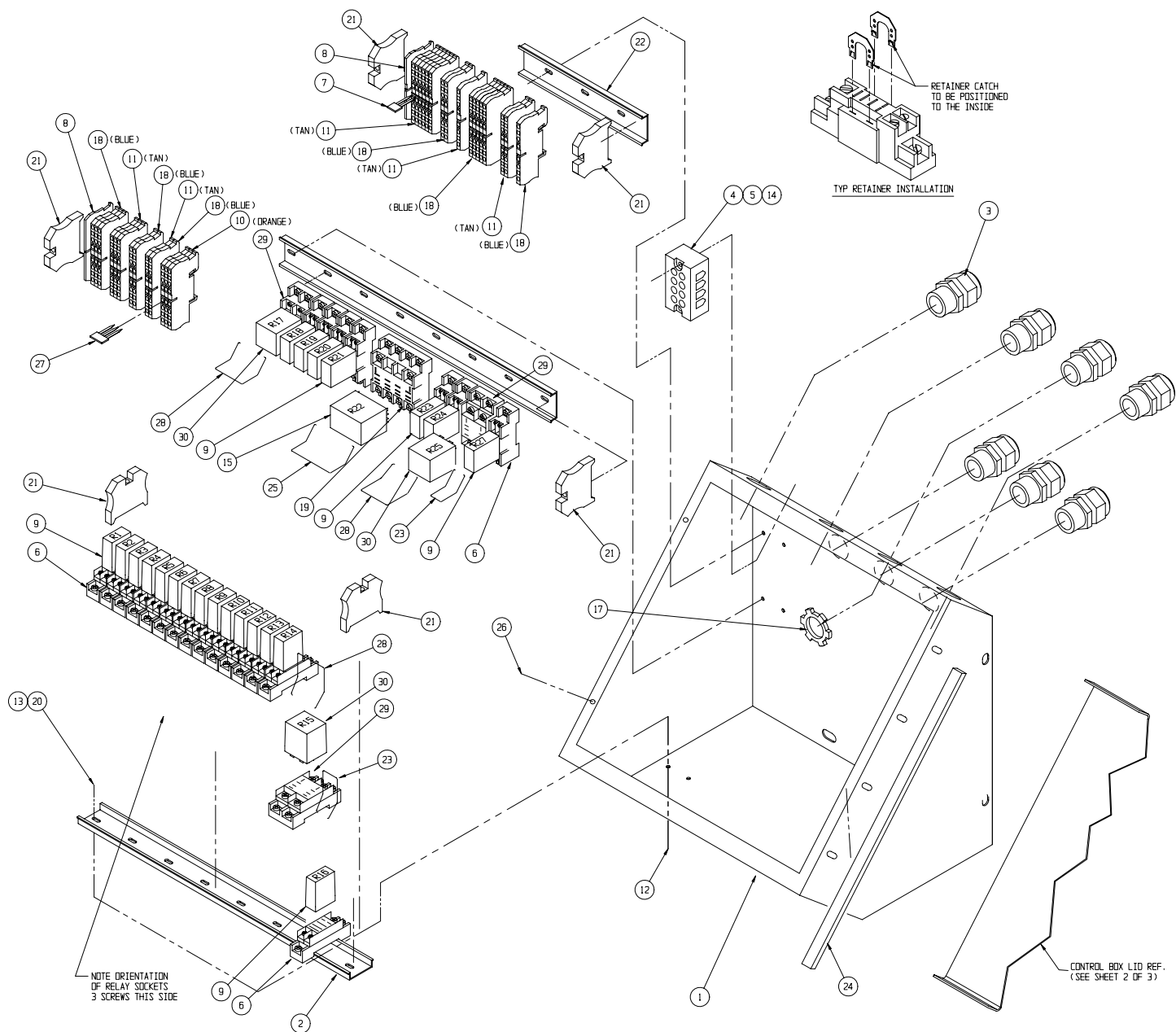
Lower Control Box Assembly, Gas

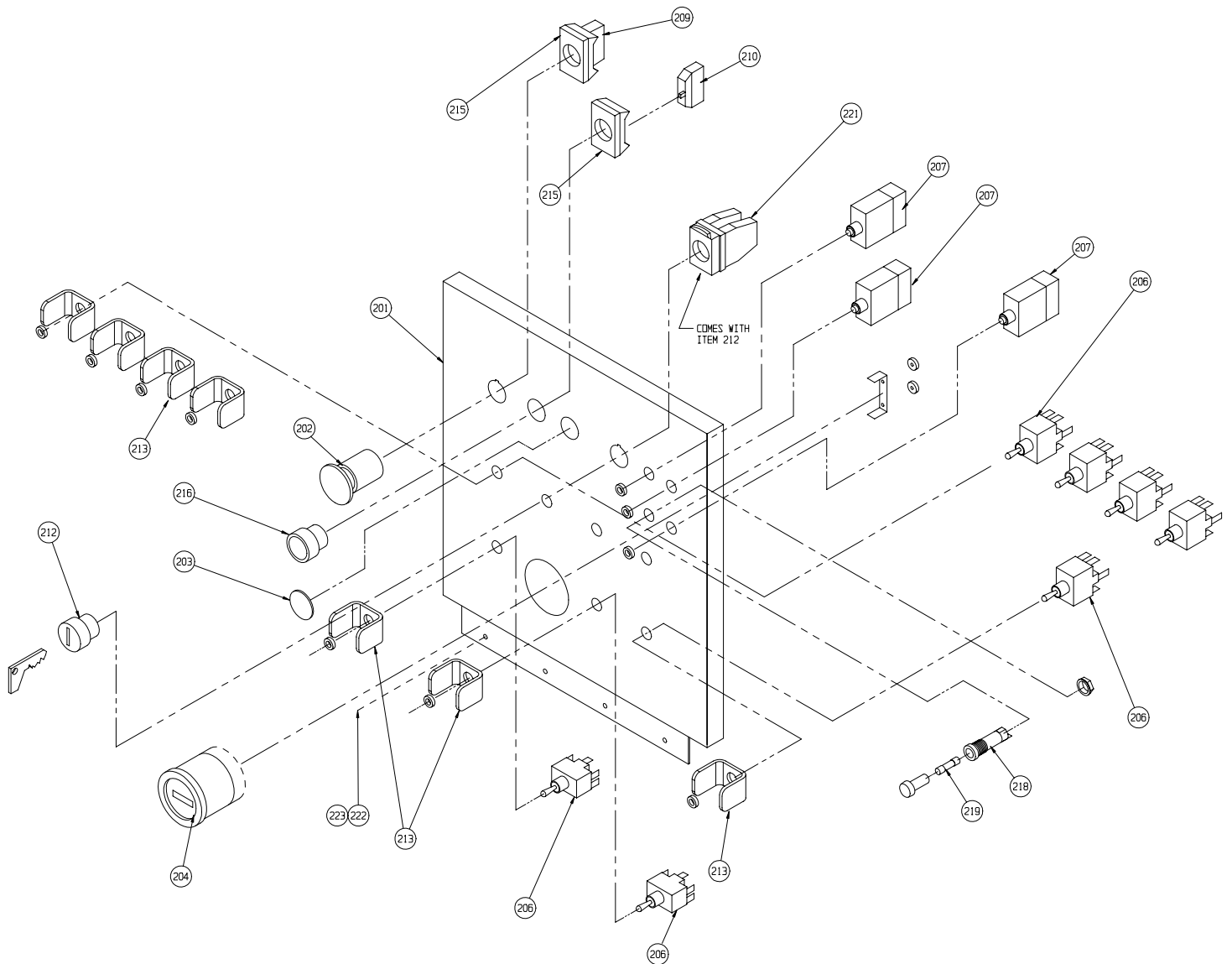
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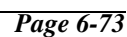
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068717-000	BOX, GROUND CONTROL	1
2	067893-002	DIN RAIL, 14" LONG	2
3	029925-001	CORD GRIP, 3/4"	7
4	068734-004	TERMINAL STRIP (120 VOLT A.C.)	1
5	011709-010	SCREW, RD HD #10-24 UNC X 1 1/4	2
6	067662-001	SOCKET, RELAY SINGLE	22
7	068773-002	JUMPER 2 PIN	1
8	068698-004	END CAP TERMINAL BLOCK	2
9	067661-001	RELAY, SPDT 12 VDC	22
10	068698-000	BLOCK, TERMINAL (ORANGE)	3
11	068698-001	BLOCK, TERMINAL (TAN)	13
12	011248-047	NUT, ESNA 6-32	6
13	011240-001	WASHER, FLAT STD #6	6
14	011248-003	LOCKNUT, #10-24 UNC ESNA	2
15	067661-004	RELAY, 12VDC (FOUR POLE)	1
16	013283-002	CABLE MOUNT	18
17	029939-003	CONDUIT LOCKNUT 3/4"	7
18	068698-002	BLOCK, TERMINAL (BLUE)	14
19	067662-004	SOCKET, RELAY FOUR	1
20	011715-003	SCREW, RD HD MACH 6-32 X 1/2	6
21	067660-006	END BLOCK, TERMINAL	6
22	067893-001	DIN RAIL 4" LONG	1
23	067662-005	RETAINER CLIP, 1 POLE RELAY	23
24	068889-099	WEATHERSTRIP (FT)	4.5 FT
25	067662-007	RETAINER CLIP, 4 POLE RELAY	1
26	014252-004	NUT-SERT 1/4-20 UNC	2
27	068773-003	JUMPER 3 PIN	1
28	067662-006	RETAINER CLIP 2 POLE	3
29	067662-002	SOCKET, RELAY 2 POLE	3
30	067661-002	RELAY 12 VOLT 2 POLE	3
201	068719-000	CONTROLLER BOX LID	1
202	064446-003	EMERGENCY STOP BUTTON	1
203	066516-006	HOLE PLUG 7/8" DIA	1
204	015752-000	HOUR METER	1
206	012798-004	TOGGLE SWITCH MOM DPDT	7
207	068582-010	CIRCUIT BREAKER 10 AMP	3
209	064443-002	CONTACT BLOCK N.C.	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
210	064443-001	CONTACT BLOCK N.O.	1
212	068588-001	KEY SELECTOR SWITCH	1
*	068807-010	KEY	1
213	08271-001	GUARD, TOGGLE SWITCH	7
215	064417-001	FLANGE, 3 CONTACT	2
216	067652-000	PUSH BUTTON, MOMENTARY GREEN	1
218	029701-000	FUSE HOLDER	1
219	029704-025	FUSE 25A	1
221	066805-012	CONTACT BLOCK, 1 N.O. INC	2
222	011709-004	SCRW MACH RD HD 10-24UNC X 1/2"	4
223	011248-003	NUT HEX ESNA 10-24 UNC	4
301	029452-099	WIRE, 16 GA. BLACK	FT 13
302	029451-099	WIRE, 16 GA. WHITE	FT 2
303	029454-099	WIRE, 16 GA. RED	FT 30
304	029457-099	WIRE, 16 GA. GREEN	FT 8.3
305	029453-099	WIRE, 16 GA. ORANGE	FT 25
306	029450-099	WIRE, 16 GA. BLUE	FT 18
307	029479-099	WIRE, 16 GA. WHITE/BLACK	FT 10
308	029478-099	WIRE, 16 GA. RED/BLACK	FT 6.5
309	05491-099	WIRE, 16 GA. GREEN/BLACK	FT 5.3
310	029477-099	WIRE, 16 GA. ORANGE/ BLACK	FT 9.5
311	029475-099	WIRE, 16 GA. BLUE/BLACK	FT 4
313	029483-099	WIRE, 16 GA. RED/WHITE	FT 3.2
314	029482-099	WIRE, 16 GA. GREEN/WHITE	FT 3.3
315	029459-099	WIRE, 16 GA. BLUE/WHITE	FT 4.3
316	029355-099	WIRE, 16 GA. BLACK/RED	FT 5.5
317	029356-099	WIRE, 16 GA. WHITE/RED	FT 3.1
318	029357-099	WIRE, 16 GA. ORANGE/RED	FT 5.8
319	029358-099	WIRE, 16 GA. BLUE/RED	FT 4.2
321	029360-099	WIRE, 16 GA. ORANGE/GREEN	FT 3
322	029825-003	DIODE 3AMP 400V	11
323	029610-002	CONN FORK TERM 16-14	150
324	029616-002	CONN F PUSH TERM 16-14 X .25	46
325	029616-001	CONN F PUSH TERM. 16-14 X .187	4

* Not shown







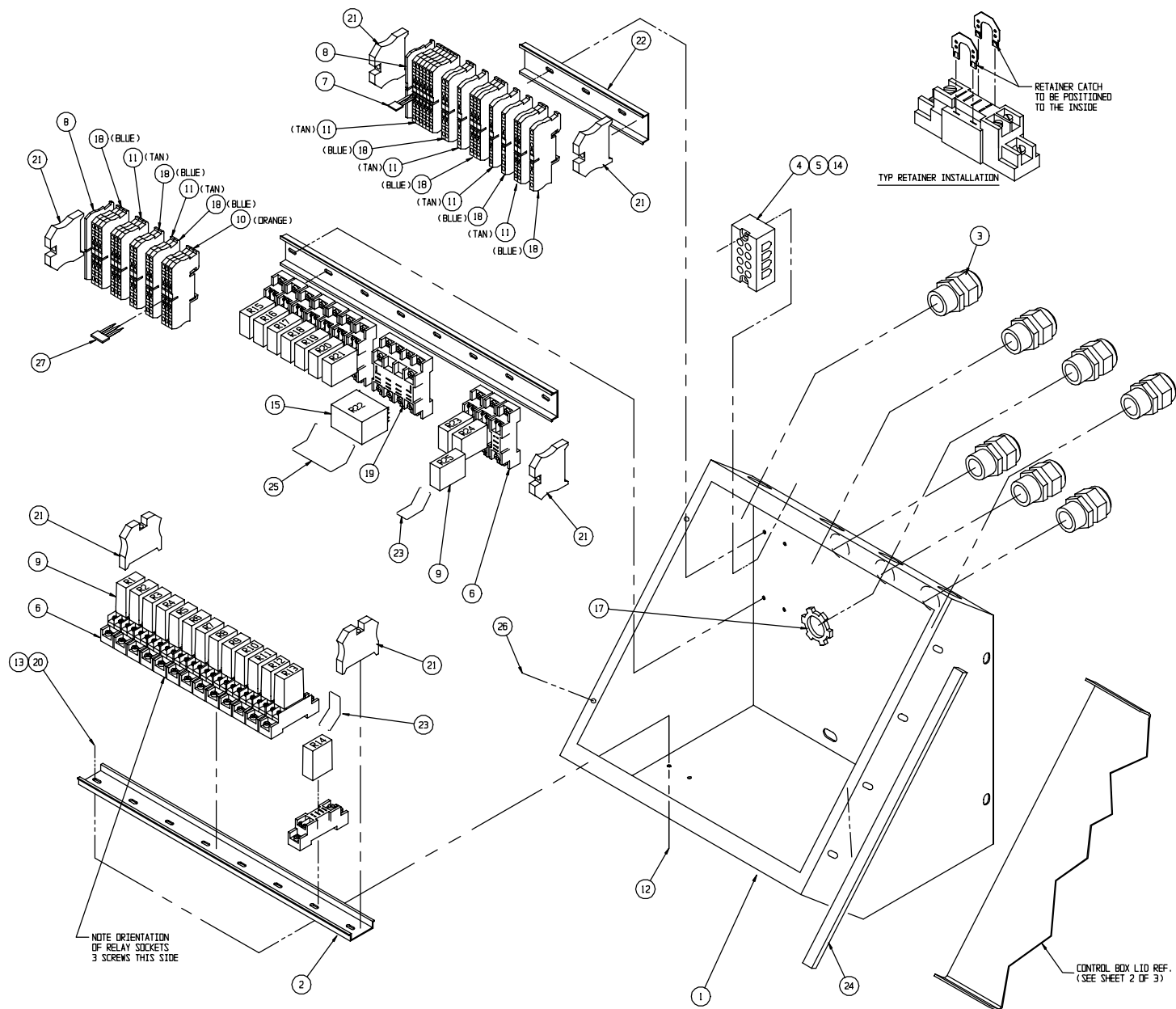
Lower Control Box Assembly, Diesel

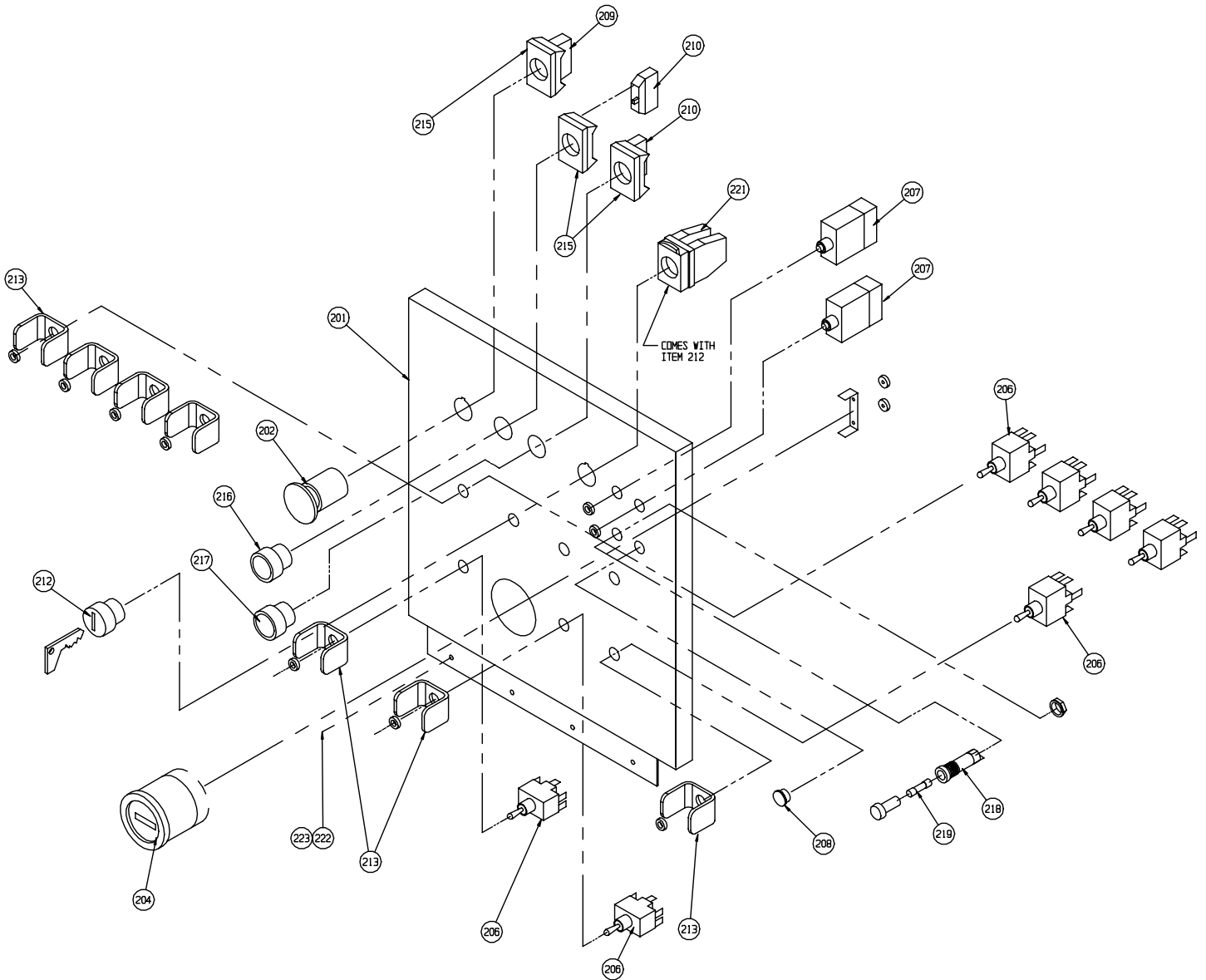
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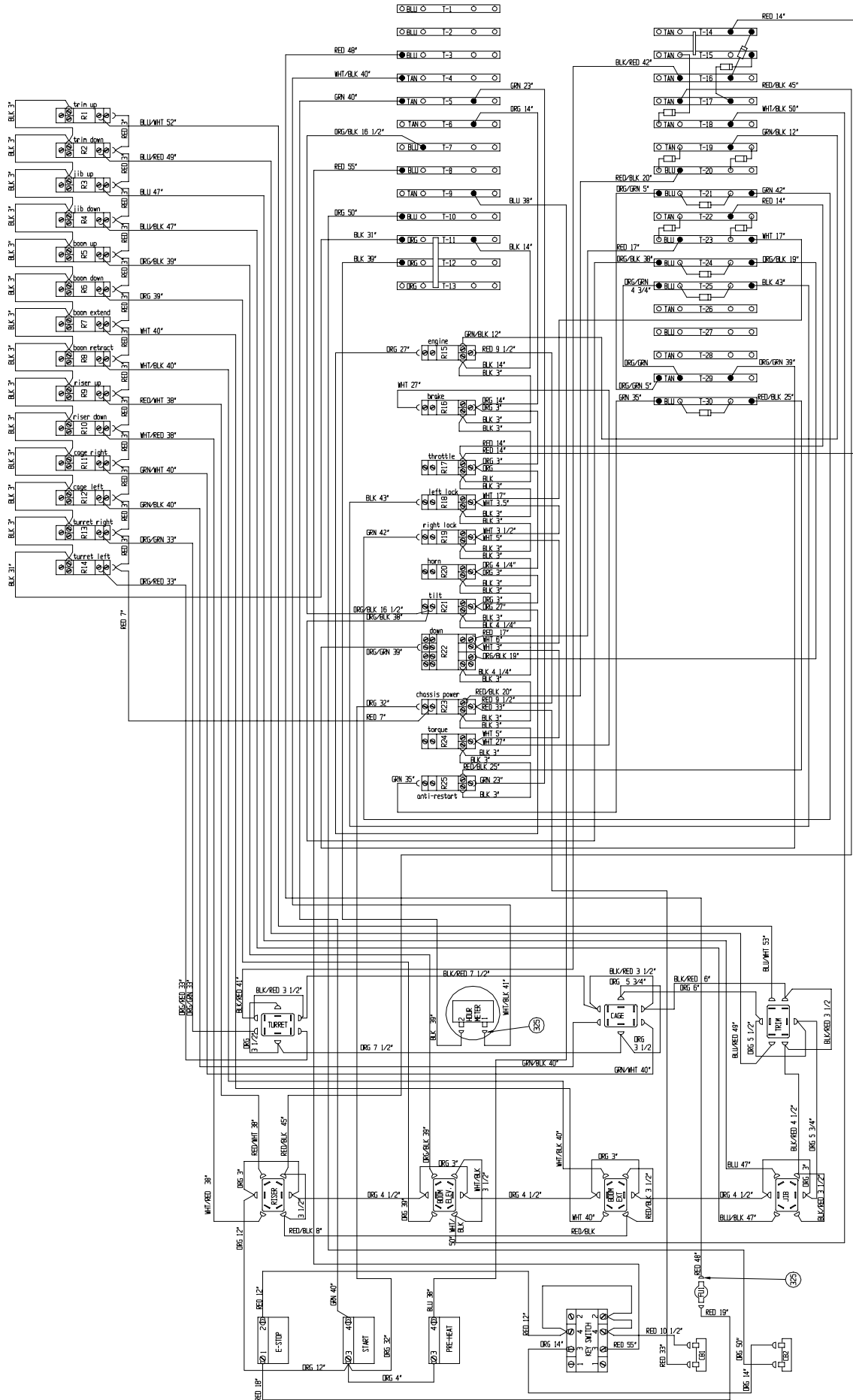
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068717-000	BOX, GROUND CONTROL	1
2	067893-002	DIN RAIL, 14" LONG	2
3	029925-001	CORD GRIP, 3/4"	7
4	068734-004	TERMINAL STRIP (120 VOLT A.C.)	1
5	011709-010	SCREW, RH #10-24 UNC X 1 1/4	2
6	067662-001	SOCKET, RELAY SINGLE	24
7	068773-002	JUMPER 2 PIN	1
8	068698-004	END CAP TERMINAL BLOCK	2
9	067661-001	RELAY, SPDT 12 VOLT DC	24
10	068698-000	BLOCK, TERMINAL (ORANGE)	3
11	068698-001	BLOCK, TERMINAL (TAN)	14
12	011248-047	NUT, ESNA 6-32	6
13	011240-001	WASHER, FLAT STD #6	6
14	011248-003	LOCKNUT, #10-24 UNC ESNA	2
15	067661-004	RELAY, 12VDC (FOUR POLE)	1
16	013283-002	CABLE MOUNT	18
17	029939-003	CONDUIT LOCKNUT 3/4"	7
18	068698-002	BLOCK, TERMINAL (BLUE)	13
19	067662-004	SOCKET, RELAY FOUR	1
20	011715-003	SCREW, RD HD MACH 6-32 X 1/2	6
21	067660-006	END BLOCK, TERMINAL	6
22	067893-001	DIN RAIL 4" LONG	1
23	067662-005	RETAINER CLIP, 1 POLE RELAY	24
24	068889-099	WEATHERSTRIP (FT)	4.5 FT
25	067662-007	RETAINER CLIP, 4 POLE RELAY	1
26	014252-004	NUT-SERT 1/4-20 UNC	2
27	068773-003	JUMPER 3 PIN	1
201	068719-000	CONTROLLER BOX LID	1
202	064446-003	EMERGENCY STOP BUTTON	1
204	015752-000	HOUR METER	1
206	012798-004	TOGGLE SWITCH MOM DPDT	7
207	068582-010	CIRCUIT BREAKER 10 AMP	2
208	066516-008	PLUG, Ø .437 HEYCO	1
209	064443-002	CONTACT BLOCK N.C.	1
210	064443-001	CONTACT BLOCK N.O.	2
212	068588-001	KEY SELECTOR SWITCH	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
*	068807-010	KEY	1
213	08271-001	GUARD, TOGGLE SWITCH	7
215	064417-001	FLANGE, 3 CONTACT	3
216	067652-000	PUSH BUTTON, MOMENTARY GREEN	1
217	067654-000	PUSH BUTTON, MOMENTARY BLACK	1
218	029701-000	FUSE HOLDER	1
219	029704-025	FUSE 25A	1
221	066805-012	CONTACT BLOCK, 1 N.O. INC	2
222	011709-004	SCRW MACH RD HD 10-24UNC X 1/2"	4
223	011248-003	NUT HEX ESNA 10-24 UNC	4
301	029452-099	WIRE, 16 GA. BLACK	FT 13
302	029451-099	WIRE, 16 GA. WHITE	FT 5
303	029454-099	WIRE, 16 GA. RED	FT 30
304	029457-099	WIRE, 16 GA. GREEN	FT 8.3
305	029453-099	WIRE, 16 GA. ORANGE	FT 25
306	029450-099	WIRE, 16 GA. BLUE	FT 18
307	029479-099	WIRE, 16 GA. WHITE/BLACK	FT 10
308	029478-099	WIRE, 16 GA. RED/BLACK	FT 6.5
309	05491-099	WIRE, 16 GA. GREEN/BLACK	FT 5.3
310	029477-099	WIRE, 16 GA. ORANGE/ BLACK	FT 9.5
311	029475-099	WIRE, 16 GA. BLUE/BLACK	FT 4
313	029483-099	WIRE, 16 GA. RED/WHITE	FT 3.2
314	029482-099	WIRE, 16 GA. GREEN/WHITE	FT 3.3
315	029459-099	WIRE, 16 GA. BLUE/WHITE	FT 4.3
316	029355-099	WIRE, 16 GA. BLACK/RED	FT 5.5
317	029356-099	WIRE, 16 GA. WHITE/RED	FT 3.1
318	029357-099	WIRE, 16 GA. ORANGE/RED	FT 5.8
319	029358-099	WIRE, 16 GA. BLUE/RED	FT 4.2
321	029360-099	WIRE, 16 GA. ORANGE/GREEN	FT 3
322	029825-003	DIODE 3AMP 400V	11
323	029610-002	CONN FORK TERM 16-14	142
324	029616-002	CONN F PUSH TERM 16-14 X .25	46
325	029616-001	CONN F PUSH TERM 16-14 X .187	4

* Not shown







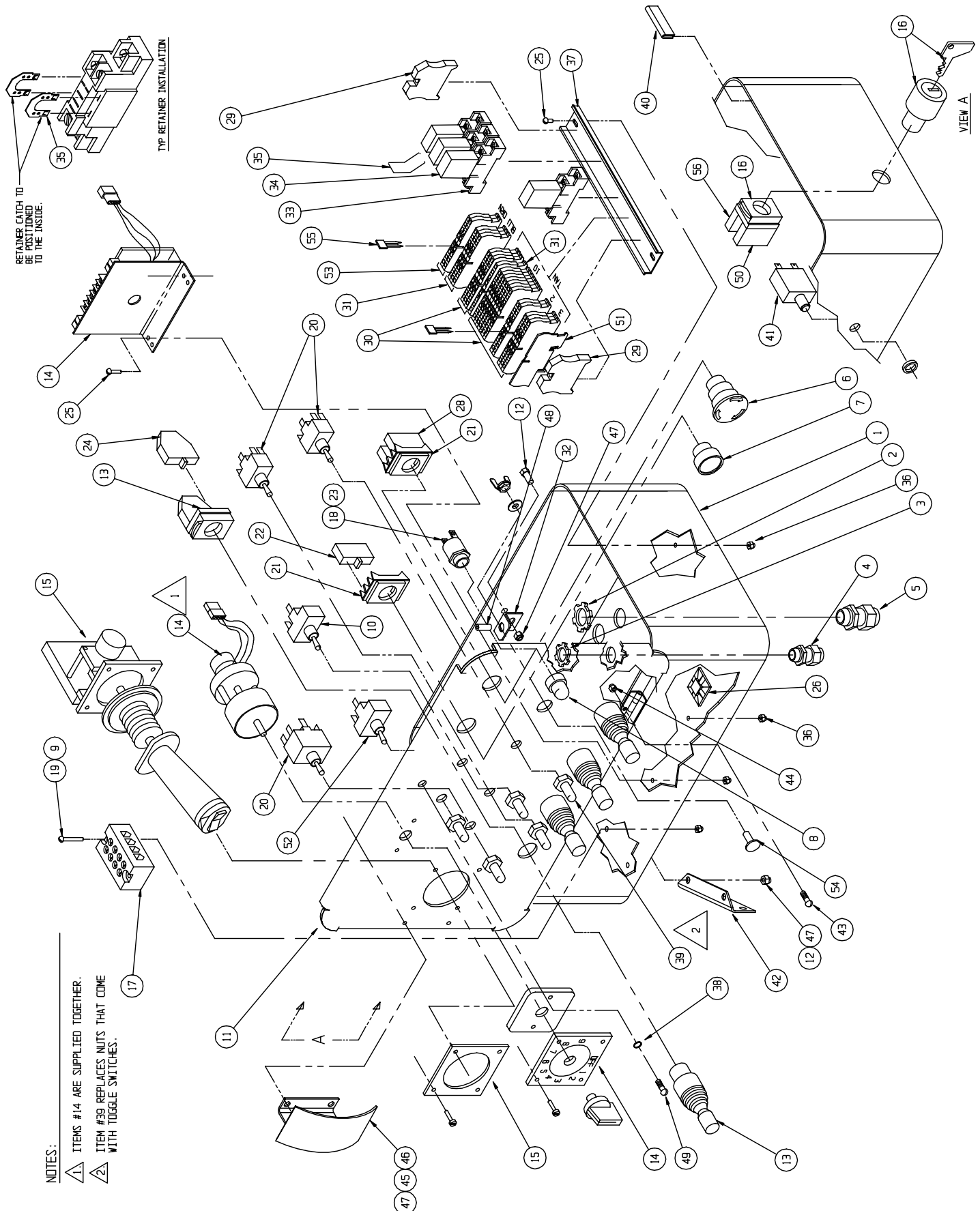
Upper Control Box Assembly, Gas

068329-006

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068589-001	BOX, ENCLOSURE	1
2	029939-003	LOCKNUT 3/4" NPT	4
3	029939-002	LOCKNUT 1/2" NPT	1
4	029925-000	CONNECTOR CABLE 1/2" NPT	1
5	029925-001	CONNECTOR CABLE 3/4" NPT	4
6	064446-003	EMERGENCY STOP BUTTON	1
7	067654-000	PUSH BUTTON FLUSH (BLACK)	1
8	068595-001	LENS, RED	1
9	011249-003	NUT, HEX 10-32 ESNA	2
10	029871-001	SWITCH, TOGGLE 2 POS HOLD SPDT	1
11	068800-000	LID ASSY, CONTROLLER I/C	1
12	011252-005	SCREW 1/4-20UNC X 5/8	5
13	068594-000	JOYSTICK - OPERATOR	4
14	068593-001	RHEOSTAT - CONTROLLER (12VOLT)	1
15	068795-000	JOYSTICK, P-Q	1
*	068795-010	HANDLE HALF, TRS, RIGHT	1
*	068795-011	HANDLE HALF, TRS, LEFT	1
*	068795-012	BOOT, M115, 0.31 SHAFT	1
*	068795-013	GASKET, M115 TRS GRIP	1
*	068795-014	SWITCH, XG3-Z1	1
*	068795-015	PUSH BUTTON, BLACK, SWITCH SPST	1
*	068795-016	SWITCH ACTUATOR, ROCKER SWCH GRP	1
*	068795-017	CAP, ROCKER SWITCH GRIP	1
*	068795-018	ELECTRICAL ASSEMBLY, M115-1596	1
*	068795-019	ELEC ASSY, 500 ohm POTENTIOMETER	1
*	068795-020	PINION GEAR, M115	1
*	068795-021	SOCKET SET SCREW, 6-32 X 1/8, CUP	1
16	068819-000	KEYSWITCH & KEY	1
*	068807-010	KEY	1
17	068734-004	TERMINAL STRIP, 120V AC	1
18	068590-000	BASE INDICATOR (LAMP)	1
19	011826-012	SCREW RD HD 10-32 X 1-1/2	2
20	012798-004	SWITCH TOGGLE 3 POS MOM DPDT	3
21	064417-001	FLANGE MOUNT	2
22	064443-001	CONTACT BLOCK, N.O.	1
23	068591-001	LAMP T-2-1/2	1
24	066805-012	CONTACT BLOCK, N.O./N.C.	8
25	011715-003	SCREW RD HD 6-32 X 3/8	4
26	013283-002	CABLE MOUNT	18
28	064443-002	CONTACT BLOCK N.C.	2
29	067660-006	TERMINAL END	2
30	068698-001	TERMINAL BLOCK (TAN)	15
31	068698-002	TERMINAL BLOCK (BLUE)	4
32	068799-000	ANGLE, CONTROLLER	1
33	067662-001	RELAY SOCKET	4
34	067661-001	RELAY, SPDT 12 VOLT	4
35	067662-005	RETAINING CLIP & WIRE	4
36	011250-001	NUT HEX 6-32	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
37	067893-003	MOUNTING RAIL, DIN 8-1/4"	1
38	013888-064	O-RING	1
39	029872-000	BOOT, SWITCH	5
40	068897-099	GASKET, BLACK RUBBER	FT 3.25
41	068582-010	CIRCUIT BREAKER 10 AMP	1
42	068767-000	BRACKET, UPPER CONTROLLER	2
43	011708-004	SCREW 8-32 X 1/2	2
44	011248-002	NUT, HEX ESNA 8-32 UNC	2
45	011252-003	SCRW HHC 1/4-20 UNC X 3/8"	2
46	068801-000	HAND SUPPORT WELDMENT	1
47	011248-004	NUT HEX ESNA 1/4-20UNC	7
48	014252-004	NUT SERT 1/4-20	1
49	011825-006	SCRW RD HD 1/4-20 UNC X 3/4"	1
50	066805-011	CONTACT BLOCK GE 1 N.C.	1
51	068698-004	END CAP, CONTACT BLOCK	1
52	012797-000	SWITCH TOGGLE 2 POS SPDT	1
53	068698-000	TERMINAL BLOCK ORANGE	2
54	069220-000	PLUG, 11/16 FLUSH	1
55	068773-002	JUMPER 2 PIN	2
56	066805-010	CONTACT BLOCK GE 1 N.O.	1
202	029454-099	WIRE 16GA RED	FT 10
203	029482-099	WIRE 16GA GREEN/WHT	FT 3
204	068735-099	WIRE 16GA BLACK/RED	FT 5
205	029452-099	WIRE 16GA BLACK	FT 9.3
206	029610-006	TERM FORK 18-14GA #6	60
207	029620-002	BUTT CONNECTOR 18-14GA	6
208	014914-001	CONN MALE PUSH INSULATED	2
209	029931-003	CONN FEMALE PUSH INSULATED	5
210	029451-099	WIRE 16GA WHITE	FT 5.8
211	029931-003	CONN FEMALE PUSH .25 (16-14GA)	12
212	029450-099	WIRE 16GA BLUE	FT 4.1
213	029825-003	DIODE 3 AMP 400V	10
214	029478-099	WIRE 16GA RED/BLACK	FT 3.5
215	029457-099	WIRE 16GA GREEN	FT 1.5
216	029616-001	CONN FEMALE PUSH .187 (16-14GA)	3
217	029360-099	WIRE 16GA ORANGE/GREEN	FT 2
218	029453-099	WIRE 16GA ORANGE	FT 1.2
219	029458-099	WIRE 16GA PURPLE	FT 1.2
220	029479-099	WIRE 16GA WHITE/BLACK	FT 4
221	029459-099	WIRE 16GA BLUE/WHITE	FT .5
222	029483-099	WIRE 16GA RED/WHITE	FT 2.5
224	029455-099	WIRE 16GA BROWN	FT 3
225	029361-099	WIRE 16GA BLK/WHT/RED	FT 2
227	REF	RECEPTACLE	

* Not shown





NOTES:

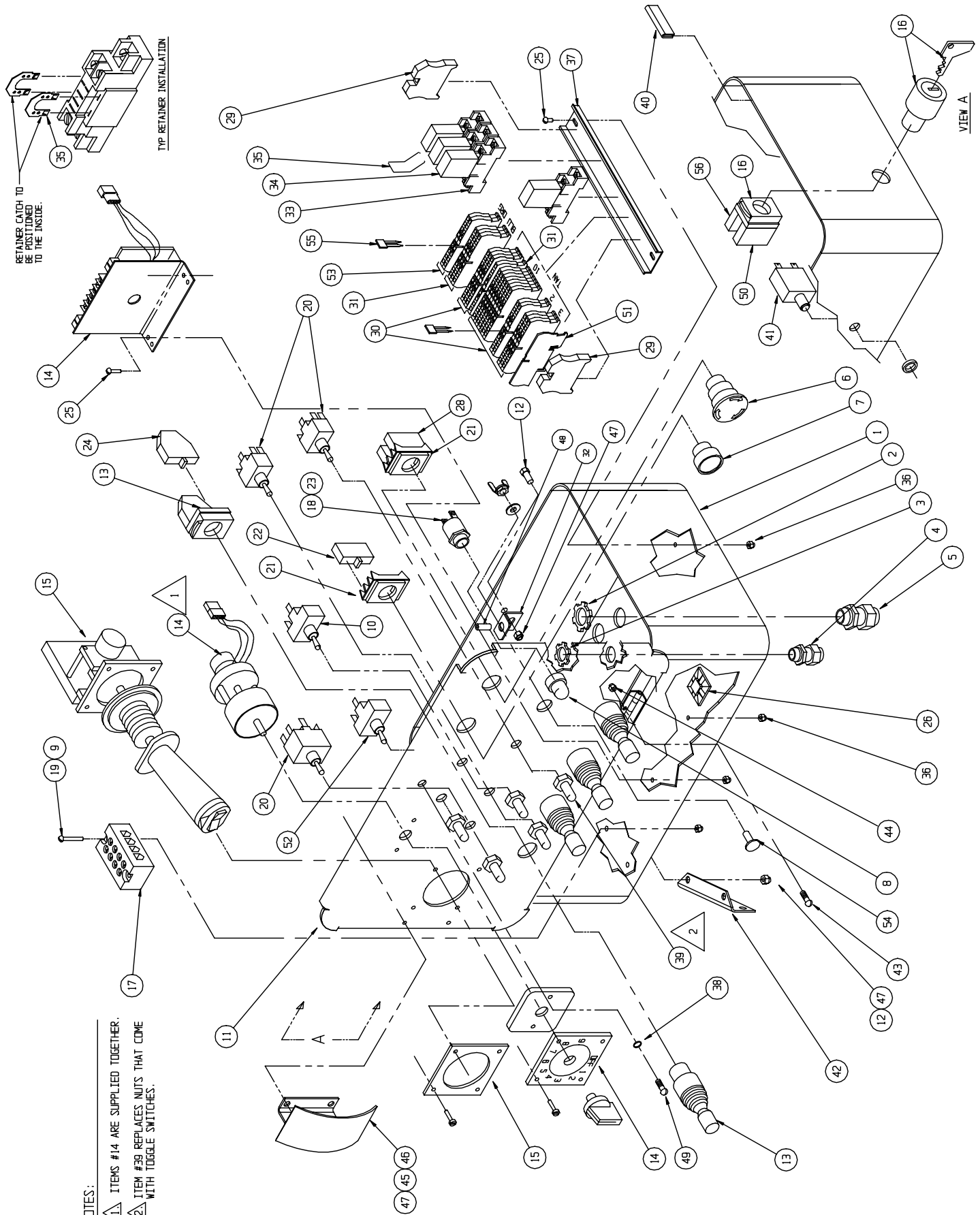
Upper Control Box Assembly, Diesel

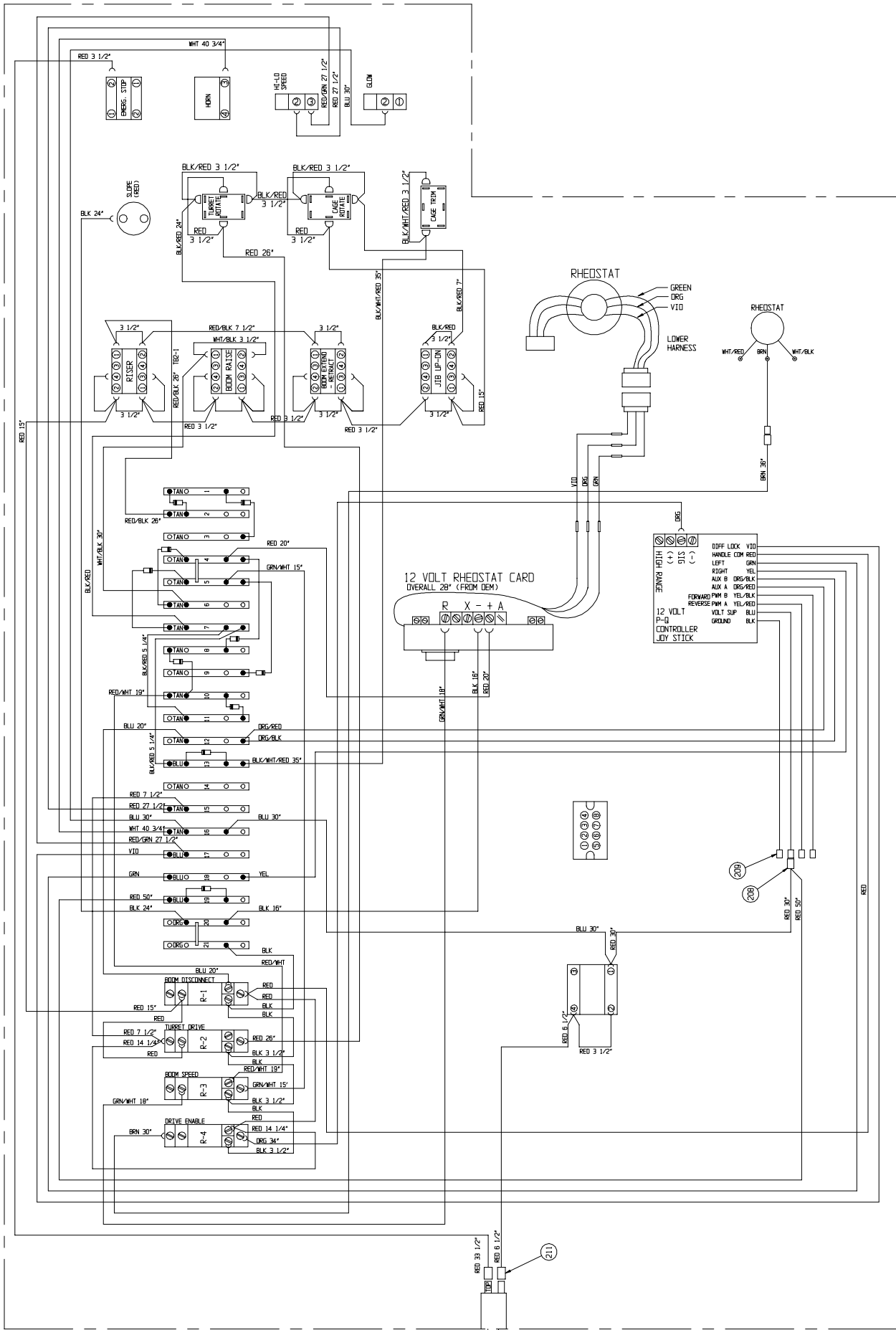
068329-007

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068589-001	BOX, ENCLOSURE	1
2	029939-003	LOCKNUT 3/4" NPT	4
3	029939-002	LOCKNUT 1/2" NPT	1
4	029925-000	CONNECTOR CABLE 1/2" NPT	1
5	029925-001	CONNECTOR CABLE 3/4" NPT	4
6	064446-003	EMERGENCY STOP BUTTON	1
7	067654-000	PUSH BUTTON FLUSH (BLACK)	1
8	068595-001	LENS, RED	1
9	011249-003	NUT, HEX 10-32 ESNA	2
10	012798-003	SWITCH, TOGGLE 2 POS MOM	1
11	068800-000	LID ASSY, CONTROLLER I/C	1
12	011252-005	SCREW 1/4-20UNC X 5/8	5
13	068594-000	JOYSTICK - OPERATOR	4
14	068593-001	RHEOSTAT - CONTROLLER (12VOLT)	1
15	068795-000	JOYSTICK, P-Q	1
*	068795-010	HANDLE HALF, TRS, RIGHT	1
*	068795-011	HANDLE HALF, TRS, LEFT	1
*	068795-012	BOOT, M115, 0.31 SHAFT	1
*	068795-013	GASKET, M115 TRS GRIP	1
*	068795-014	SWITCH, XG3-Z1	1
*	068795-015	PUSH BUTTON, BLACK, SWITCH SPST	1
*	068795-016	SWITCH ACTUATOR, ROCKER SWCH GRIP	1
*	068795-017	CAP, ROCKER SWITCH GRIP	1
*	068795-018	ELECTRICAL ASSEMBLY, M115-1596	1
*	068795-019	ELEC ASSY, 500 ohm POTENTIOMETER	1
*	068795-020	PINION GEAR, M115	1
*	068795-021	SOCKET SET SCREW, 6-32 X 1/8, CUP	1
16	068819-000	KEYSWITCH & KEY	1
*	068807-010	KEY	1
17	068734-004	TERMINAL STRIP, 120V AC	1
18	068590-000	BASE INDICATOR (LAMP)	1
19	011826-012	SCREW RD HD 10-32 X 1-1/2	2
20	012798-004	SWITCH TOGGLE 3 POS MOM DPDT	3
21	064417-001	FLANGE MOUNT	2
22	064443-001	CONTACT BLOCK, N.O.	1
23	068591-001	LAMP T-2-1/2	1
24	066805-012	CONTACT BLOCK, N.O./N.C.	8
25	011715-003	SCREW RD HD 6-32 X 3/8	4
26	013283-002	CABLE MOUNT	18
28	064443-002	CONTACT BLOCK N.C.	2
29	067660-006	TERMINAL END	2
30	068698-001	TERMINAL BLOCK (TAN)	15
31	068698-002	TERMINAL BLOCK (BLUE)	4
32	068799-000	ANGLE, CONTROLLER	1
33	067662-001	RELAY SOCKET	4
34	067661-001	RELAY, SPDT 12 VOLT	4
35	067662-005	RETAINING CLIP & WIRE	4
36	011250-001	NUT HEX 6-32	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
37	067893-003	MOUNTING RAIL, DIN 8-1/4"	1
38	013888-064	O-RING	1
39	029872-000	BOOT, SWITCH	5
40	068897-099	GASKET, BLACK RUBBER	FT 3.25
41	068582-010	CIRCUIT BREAKER 10 AMP	1
42	068767-000	BRACKET, UPPER CONTROLLER	2
43	011708-004	SCREW 8-32 X 1/2	2
44	011248-002	NUT, HEX ESNA 8-32 UNC	2
45	011252-003	SCRW HHC 1/4-20 UNC X 3/8"	2
46	068801-000	HAND SUPPORT WELDMENT	1
47	011248-004	NUT HEX ESNA 1/4-20UNC	7
48	014252-004	NUT SERT 1/4-20	1
49	011825-006	SCRW RD HD 1/4-20 UNC X 3/4"	1
50	066805-011	CONTACT BLOCK GE 1 N.C.	1
51	068698-004	END CAP, CONTACT BLOCK	1
52	012797-000	SWITCH TOGGLE 2 POS SPDT	1
53	068698-000	TERMINAL BLOCK ORANGE	2
54	069220-000	PLUG, 11/16 FLUSH	1
55	068773-002	JUMPER 2 PIN	2
56	066805-010	CONTACT BLOCK GE 1 N.O.	1
202	029454-099	WIRE 16GA RED	FT 10
203	029482-099	WIRE 16GA GREEN/WHT	FT 3
204	068735-099	WIRE 16GA BLACK/RED	FT 5
205	029452-099	WIRE 16GA BLACK	FT 9.3
206	029610-006	TERM FORK 18-14GA #6	60
207	029620-002	BUTT CONNECTOR 18-14GA	6
208	014914-001	CONN MALE PUSH INSULATED	2
209	029931-003	CONN FEMALE PUSH INSULATED	5
210	029451-099	WIRE 16GA WHITE	FT 5.8
211	029931-003	CONN FEMALE PUSH .25 (16-14GA)	12
212	029450-099	WIRE 16GA BLUE	FT 4.1
213	029825-003	DIODE 3 AMP 400V	10
214	029478-099	WIRE 16GA RED/BLACK	FT 3.5
215	029457-099	WIRE 16GA GREEN	FT 1.5
216	029616-001	CONN FEMALE PUSH .187 (16-14GA)	3
217	029360-099	WIRE 16GA ORANGE/GREEN	FT 2
218	029453-099	WIRE 16GA ORANGE	FT 1.2
219	029458-099	WIRE 16GA PURPLE	FT 1.2
220	029479-099	WIRE 16GA WHITE/BLACK	FT 4
221	029459-099	WIRE 16GA BLUE/WHITE	FT .5
222	029483-099	WIRE 16GA RED/WHITE	FT 2.5
224	029455-099	WIRE 16GA BROWN	FT 3
227	REF	RECEPTACLE	1
229	029361-099	WIRE 16 GA BLK/WHT/RED	FT 2

* Not shown



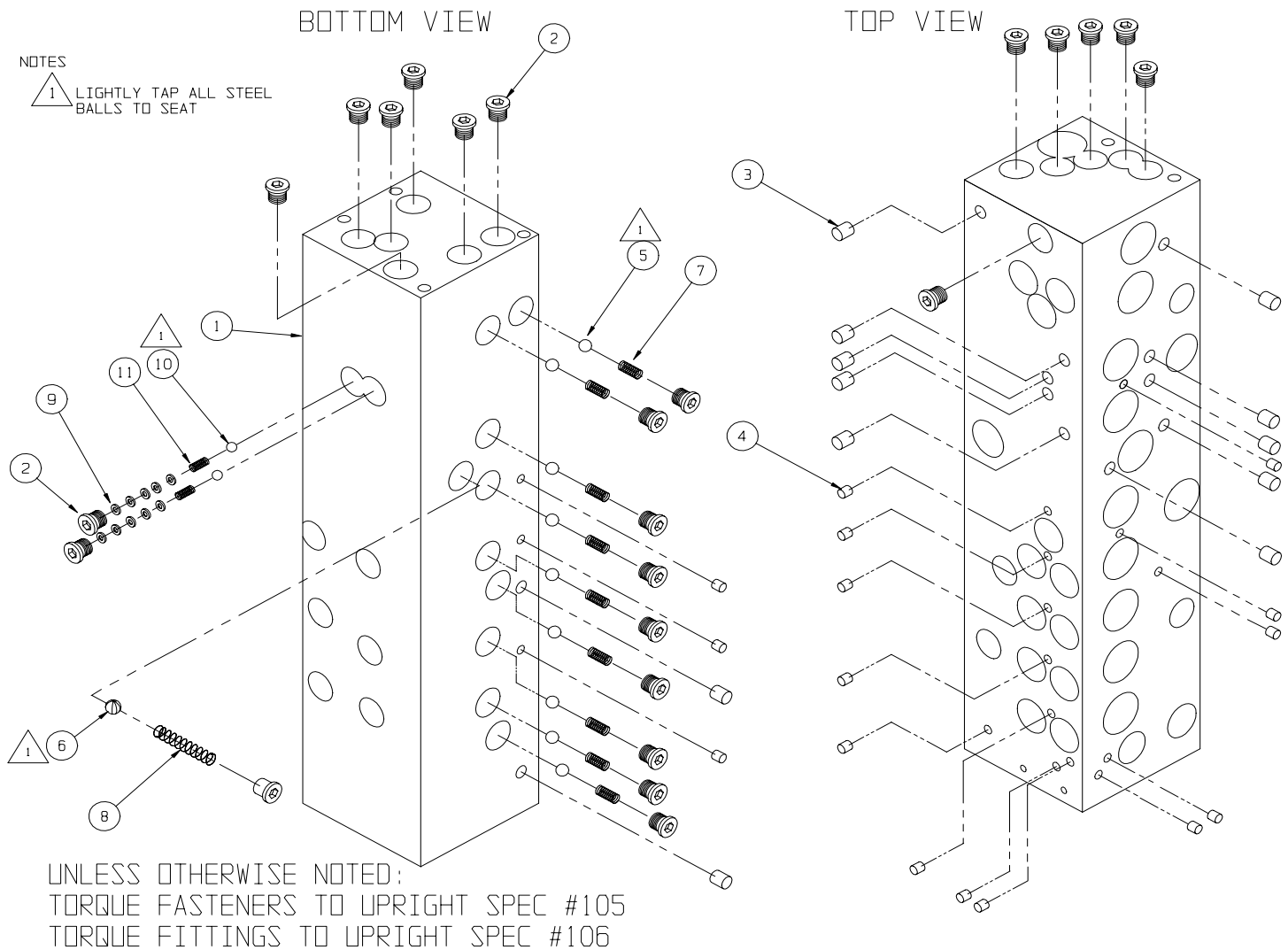


Valve Block Sub-Assembly

068349-001

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068424-001	VALVE BLOCK	1
2	012004-004	PLUG, #4 S.A.E.	24
3	063977-001	PLUG, KOENIG 9MM (MB-800-090)	12
4	063977-010	PLUG, KOENIG 1/4"	16
5	05135-000	STEEL BALL 5/16" DIA.	9
6	061827-003	STEEL BALL 3/8" DIA.	1

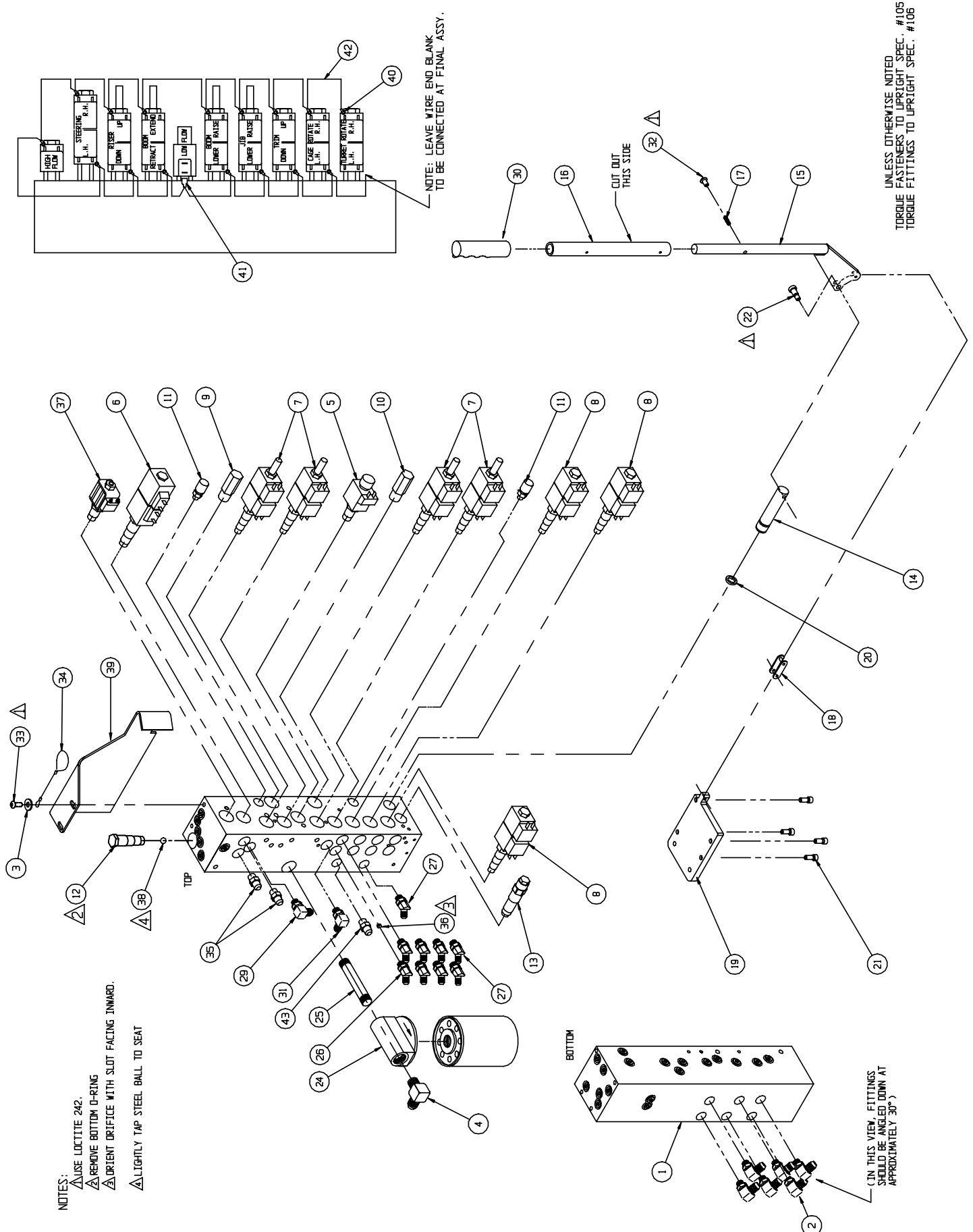
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
7	013987-009	SPRING, Ø 1/4 X 19/32 LG.	9
8	015799-000	SPRING, Ø 5/16 X 1 25/32	1
9	011240-001	WASHER FLAT #6 STD	10
10	061827-006	STEEL BALL 3/16" DIA	2
11	068790-000	SPRING, Ø 1/4 X 13/16 LG	2



Valve Block Assembly

068348-002

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068349-001	VALVE BLOCK SUB-ASSY.	1	22	015936-005	SCREW, SHOULDER Ø 3/8 X 5/8 LG	1
2	011934-001	FITTING, 2062-4-4S	6	24	005154-001	FILTER ASSY.	1
3	011240-005	WASHER 5/16 FLAT	2	*	005154-002	FILTER REPLACEMENT	1
4	011940-019	90° ELBOW 3/4NPT X 3/4 JIC	1	25	014028-008	PIPE NIPPLE, 3/4 SCHD 40 X 4	1
5	068681-000	FLOW CNTRL, WATERMAN 12C241SP-11/A10	1	26	011935-013	FITTING 45° 6MB-4MJ	1
6	068683-000	3 POS, 4 WAY, TANDEM CENTER	1	27	011935-001	FITTING, 45° SWIVEL EL. 4MB-4MJ	8
7	068682-000	3 POS, 4 WAY, CLOSED CENTER	4	29	011934-004	FITTING 90° EL. 6MB-6MJ	1
8	068684-000	3 POS, 4 WAY, MOTOR SPOOL	3	30	068700-000	HAND GRIP, VINYL	1
9	060390-018	RELIEF VALVE, 2750 PSI	1	31	011934-003	FITTING 2062-6-4S	1
10	060390-019	RELIEF VALVE, 1600 PSI	1	32	011821-004	SCRW BUTT HEAD 1/4-20UNC X 1/2	1
11	063965-001	PLUG, GAGE PORT	2	33	011822-006	SCRW BUTT HEAD 5/16-18 UNC X 3/4	2
12	068558-000	DIVERter VALVE	1	34	063783-002	LANYARD ASSY	1
13	068778-014	COUNTERBALANCE VALVE	1	35	011941-005	FITTING 202702-6-6S	2
14	068430-000	PISTON, HAND PUMP	1	36	015919-000	ORFICE	1
15	068428-000	LEVER WELDMENT, HAND PUMP	1	37	068781-001	VALVE	1
16	068429-000	LEVER EXTENSION, HAND PUMP	1	38	061827-000	STEEL BALL 7/16 DIA	1
17	068564-001	DETENT BALL / SPRING	1	39	068791-000	BRACKET	1
18	068566-000	PIVOT LINK	1	40	029601-012	CONN. RING, 18-14 GA. #8	16
19	068425-000	MOUNTING PLATE, VALVE BLOCK	1	41	029616-002	CONN. FEM. PUSH, .25	1
20	012499-016	SEAL, POLYPAK #12500625	1	42	029452-099	WIRE, 16 GA. BLACK	3 FT
21	014334-004	SCREW. SOC. HD. 5/16-18 UNC X 1/2	4	43	011941-002	FITTING STR 4MB-6MJ	1

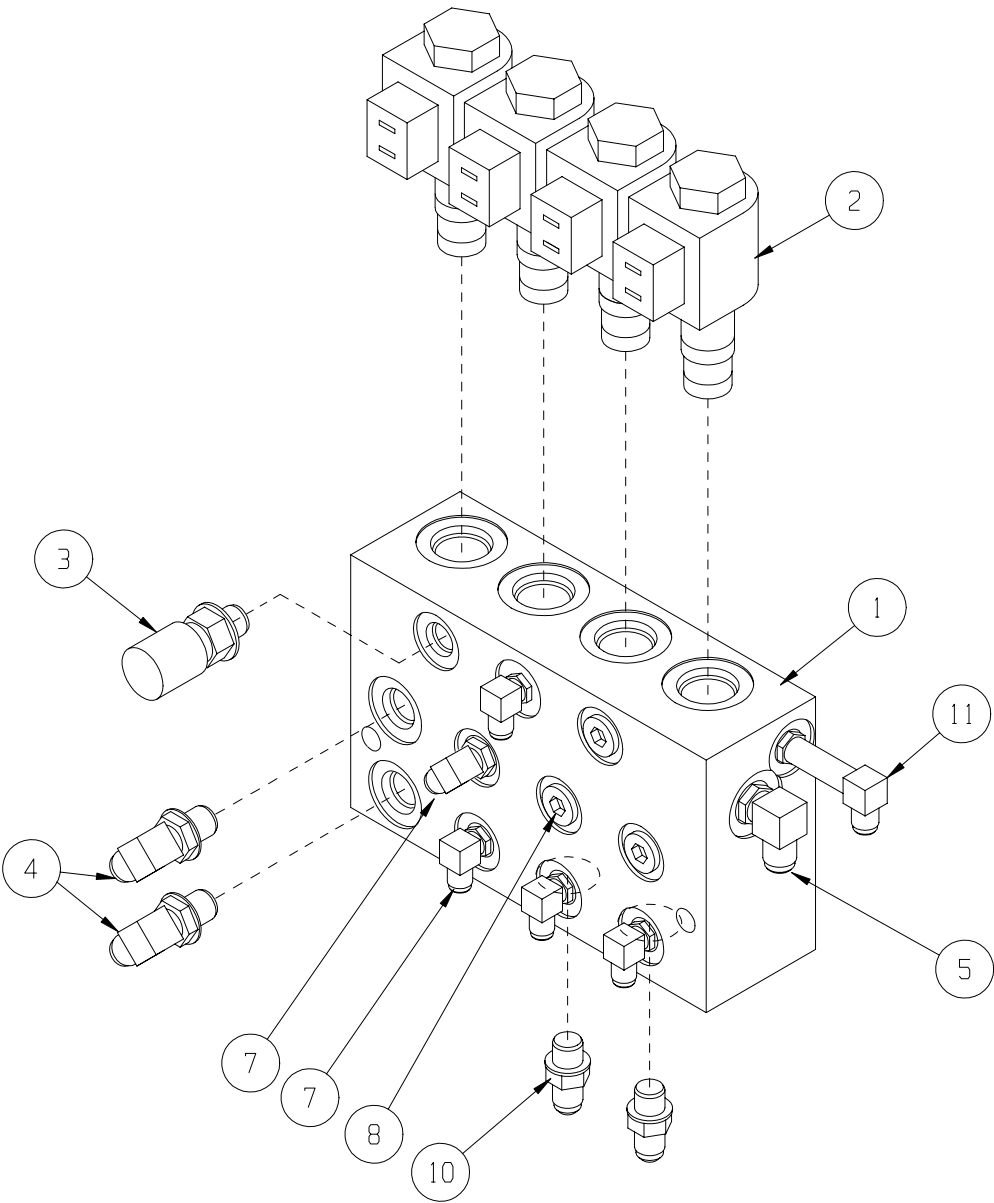


Drive Valve Block Assembly

068953-000 | Four Valve Type |

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068859-000	VALVE BLOCK	1
2	067649-000	VALVE, 2 POSITION - 3 WAY	4
3	063965-001	PLUG, GAUGE PORT	1
4	011934-003	FITTING, 90° 6MB-4MJ	2
5	011934-004	FITTING, 90° 6MB-6MJ	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
7	011934-001	FITTING, 90° 4MB-4MJ	5
8	012004-004	PLUG, #4 S.A.E.	3
10	011941-001	FITTING, STR. ADAPTER 4MB-4MJ	2
11	015736-001	FITTING, LG. 90° 4MB-4MJ	1

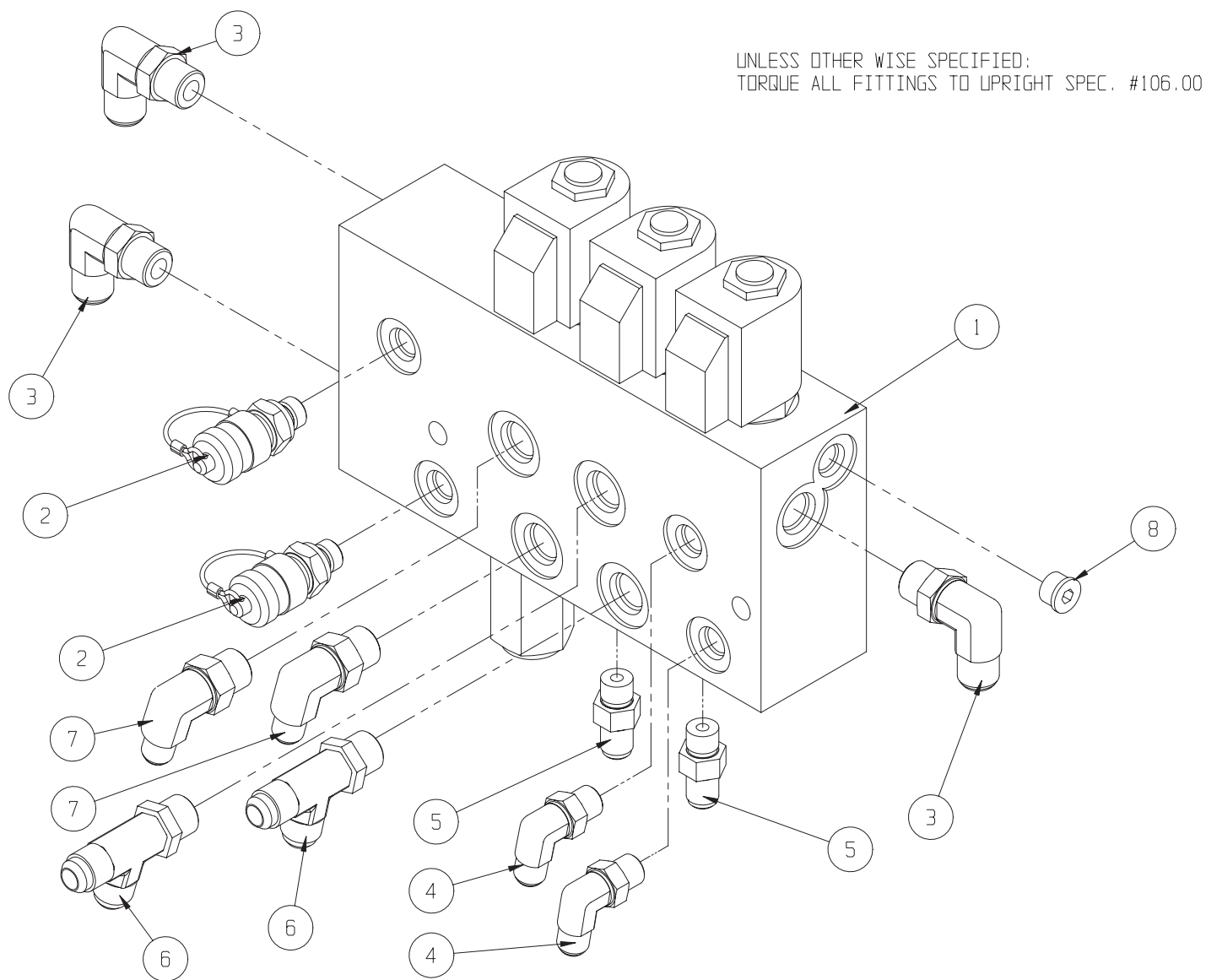


Drive Block Assembly

109109-000 | Three Valve Type |

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	109084-000	VALVE BLOCK	1
2	063965-001	TEST PORT	2
3	011934-004	FITTING, ELBOW 90 6MB-6MJ	3
4	011934-001	FITTING, ELBOW 90 4MB-4MJ	2
5	011941-001	FITTING, STR 4MB-4MJ	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
6	015961-006	FITTING, TEE 6MB-6MJ-6MJ	2
7	011934-003	FITTING, ELBOW 90 6MB-4MJ	2
8	012004-004	PLUG - PARKER #05HP-04	1

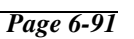


Hose Kit - 4-Valve Drive Block

068336-003

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068737-324	1/4 HOSE ASSY X 324" 4FJX -4FJX	2
2	061351-037	1/8 HOSE ASSY X 15" 4FJX-4FJX	1
3	068737-720	1/4 HOSE ASSY X 720" 4FJX-4FJX	2
4	068808-264	1/4 HOSE ASSY X 264" 4FJX-4FJX	2
5	068737-047	1/4 HOSE ASSY X 47" 4FJX-4FJX	1
6	068736-616	3/16 HOSE ASSY X 616" 4FJX-4FJX	2
7	068736-350	3/16 HOSE ASSY X 350" 4FJX-4FJX	2
8	061351-013	1/8 HOSE ASSY X 57" 4FJX-4FJX	1
9	068737-312	1/4 HOSE ASSY X 312" 4FJX-4FJX	2
10	068737-177	1/4 HOSE ASSY X 177" 4FJX-4FJX	2
11	068964-099	1/4 HOSE ASSY X 99" 6FJX-6FJX90°S	2
12	061351-054	1/8 HOSE ASSY X 94" 4FJX-4FJX	2
13	068964-072	1/4 HOSE ASSY X 72" 6FJX-6FJX90°	1
14	068753-066	1/4 HOSE ASSY X 66" 4FJX-6FJX90°	1
15	068740-066	1/2 HOSE ASSY X 66" 10FJX-10FJX	1
16	068965-076	3/8 HOSE ASSY X 76" 6FJX-6FJX90°	1
17	068745-046	3/8 HOSE ASSY X 46" 6FJX-6FJX	1
18	068736-021	3/16 HOSE ASSY X 21" 4FJX-4FJX	1
19	068736-019	3/16 HOSE ASSY X 19" 4FJX-4FJX	1
20	068737-094	1/4 HOSE ASSY X 94" 4FJX-4FJX	2
21	068739-020	1" HOSE ASSY X 20" 16FJX-16FJX	1
22	068745-089	3/8 HOSE ASSY X 89" 6FJX- 6FJX	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
23	068745-044	3/8 HOSE ASSY X 44" 6FJX- 6FJX	1
24	068737-064	1/4 HOSE ASSY X 64" 4FJX- 4FJX	1
25	068737-023	1/4 HOSE ASSY X 23" 4FJX-4FJX	1
26	068962-024	5/8 HOSE ASSY X 24-1/2"10FJX- 10FJX	2
27	068745-062	3/8 HOSE ASSY X 62" 6FJX-6FJX	1
28	068962-095	5/8 HOSE ASSY X 95" 10FJX- 10FJX	2
29	068963-066	5/8 HOSE ASSY X 66" 10FJX-12FL	2
30	068744-015	3/4 HOSE ASSY X 15" 12FJX-12FJX	1
31	068743-026	5/8 HOSE ASSY X 26" 10FJX-10FJX	1
32	068963-030	5/8 HOSE ASSY X 30" 10FJX-12FL	2
33	069224-065	5/8 HOSE ASSY X 65" 10FJX-10FJX90°	1
34	068753-014	1/4 HOSE ASSY X 14" 4FJX-6FJX90	2
35	068763-060	1/4 HOSE ASSY X 60" 4FJX-6FJX	1
36	020032-003	FITTING TEE	REF
37	020032-007	FITTING TEE	REF
38	067673-005	FITTING, CROSS	REF
39	014693-005	FITTING, REDUCER	REF
40	011979-006	O-RING	REF
41	068952-000	CHECK VALVE	REF
42	011934-004	FITTING 90°	REF
43	068737-026	1/4 HOSE ASSY X 26" 4FJX-4FJX	1

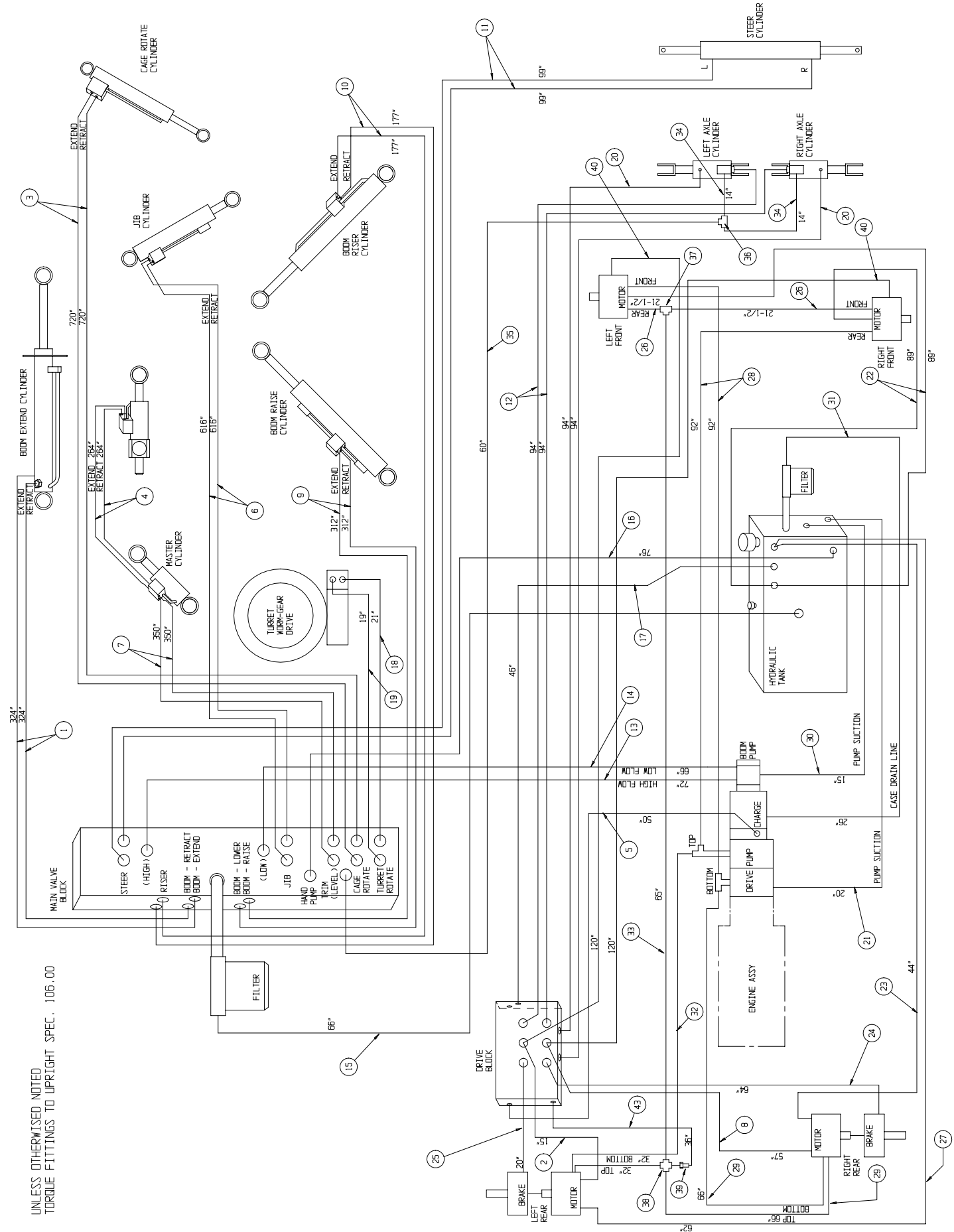


Hose Kit - 3-Valve Drive Block

068336-005

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068737-324	1/4 HOSE ASSY X 324" 4FJX -4FJX	2
2	068763-015	1/4 HOSE ASSY X 15" 4FJX-6FJX	1
3	068737-720	1/4 HOSE ASSY X 720" 4FJX-4FJX	2
4	068808-264	1/4 HOSE ASSY X 264" 4FJX-4FJX	2
5	068763-050	1/4 HOSE ASSY X 50" 4FJX-6FJX	1
6	068736-616	3/16 HOSE ASSY X 616" 4FJX-4FJX	2
7	068736-350	3/16 HOSE ASSY X 350" 4FJX-4FJX	2
8	068763-060	1/4 HOSE ASSY X 60" 4FJX-6FJX	1
9	068737-312	1/4 HOSE ASSY X 312" 4FJX-4FJX	2
10	068737-177	1/4 HOSE ASSY X 177" 4FJX-4FJX	2
11	068964-099	1/4 HOSE ASSY X 99" 6FJX-6FJX90S	2
12	061351-054	1/8 HOSE ASSY X 94" 4FJX-4FJX	2
13	068964-072	1/4 HOSE ASSY X 72" 6FJX-6FJX90	1
14	068753-066	1/4 HOSE ASSY X 66" 4FJX-6FJX90	1
15	068740-066	1/2 HOSE ASSY X 66" 10FJX-10FJX	1
16	068965-076	3/8 HOSE ASSY X 76" 6FJX-6FJX90	1
17	068745-046	3/8 HOSE ASSY X 46" 6FJX-6FJX	1
18	068736-021	3/16 HOSE ASSY X 21" 4FJX-4FJX	1
19	068736-019	3/16 HOSE ASSY X 19" 4FJX-4FJX	1
20	068737-094	1/4 HOSE ASSY X 94" 4FJX-4FJX	2
21	068739-020	1" HOSE ASSY X 20" 16FJX-16FJX	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
22	068745-089	3/8 HOSE ASSY X 89" 6FJX- 6FJX	2
23	068745-044	3/8 HOSE ASSY X 44" 6FJX- 6FJX	1
24	068737-064	1/4 HOSE ASSY X 64" 4FJX- 4FJX	1
25	068737-023	1/4 HOSE ASSY X 23" 4FJX-4FJX	1
26	068962-021	5/8 HOSE ASSY X 21-1/2"10FJX- 10FJX	2
27	068745-062	3/8 HOSE ASSY X 62" 6FJX-6FJX	1
28	068962-092	5/8 HOSE ASSY X 92" 10FJX- 10FJX	2
29	068962-066	5/8 HOSE ASSY X 66" 10FJX-10FJX	2
30	068744-015	3/4 HOSE ASSY X 15" 12FJX-12FJX	1
31	068743-026	5/8 HOSE ASSY X 26" 10FJX-10FJX	1
32	068962-032	5/8 HOSE ASSY X 32" 10FJX-10FJX	2
33	069224-065	5/8 HOSE ASSY X 65" 10FJX-10FJX90	1
34	068753-014	1/4 HOSE ASSY X 14" 4FJX-6FJX90	2
35	068763-060	1/4 HOSE ASSY X 60" 4FJX-6FJX	1
36	020032-003	FITTING TEE	1
37	020032-007	FITTING TEE	1
38	067673-005	FITTING, CROSS	1
39	014693-005	FITTING, REDUCER	1
40	068753-120	1/4 HOSE ASSY X 120" 4FJX-6FJX90	2
43	067684-036	3/8 HOSE ASSY X 36" 6FJX-6FJX90	1

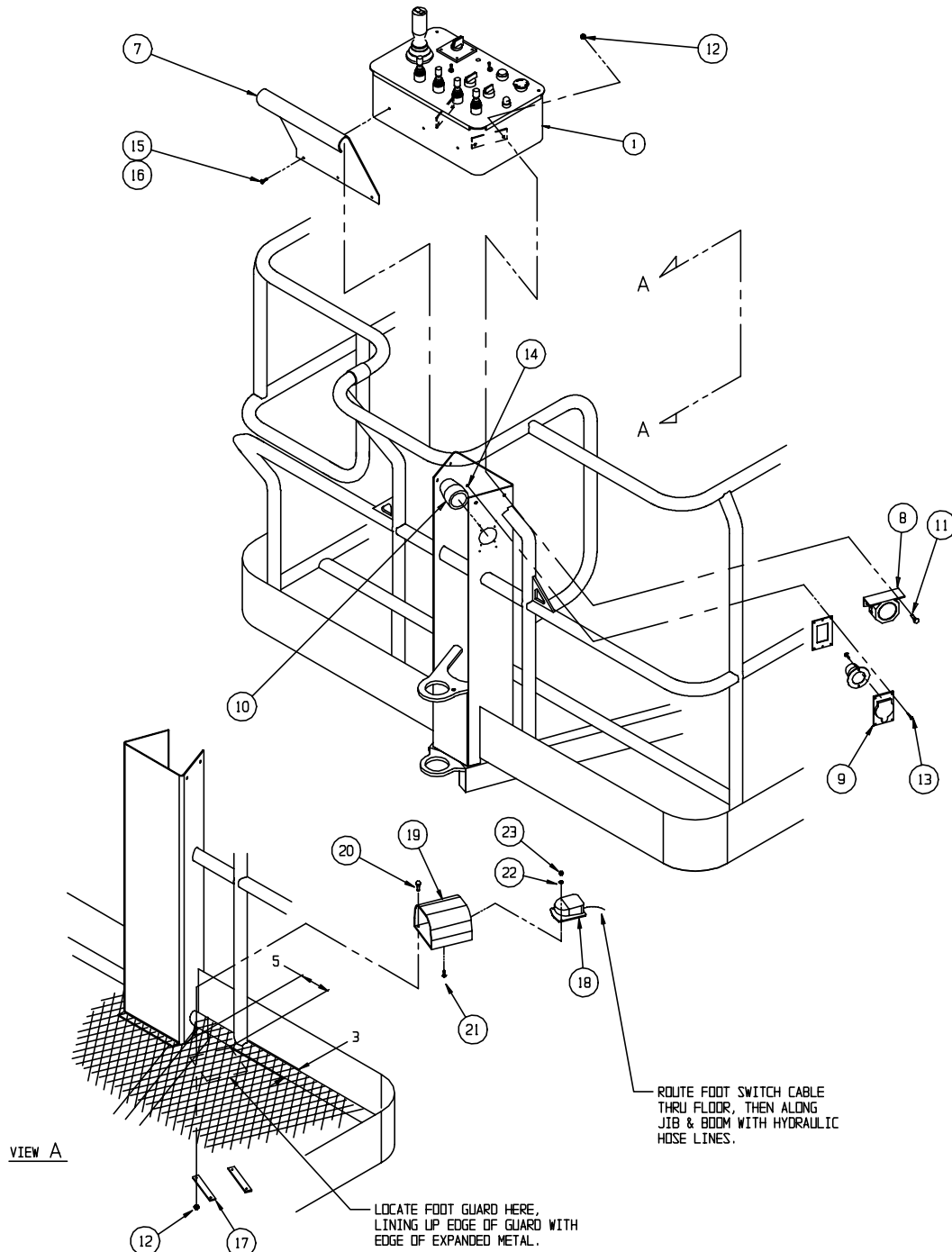


Controller Installation, Gas

068339-007

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068329-006	CONTROLLER ASSY - DOM R/T (GAS)	1
7	068750-000	DECAL MOUNT	1
8	063778-001	ALARM	1
9	08942-001	FEMALE RECEPTACLE	1
10	029961-001	SEAL	1
11	011252-008	SCREW HHC 1/4-20 UNC X 1	4
12	011248-004	NUT HEX 1/4-20 UNC ESNA	8
13	011715-006	SCREW RD HD 6-32 UNC X 3/4	4
14	011248-047	NUT HEX 6-32 UNC ESNA	4
15	011709-006	SCREW RD HD 10-24 UNC X 3/4	3

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
16	011248-003	NUT HEX 10-24 UNC ESNA	3
17	068820-000	RETAINING STRAP-FOOTSWITCH	2
18	063906-000	FOOT SWITCH CLPR	1
19	064479-000	SWITCH GUARD, FOOT	1
20	011252-012	SCREW HHC 1/4-20 UNC X 1 1/2	4
21	066695-006	SCREW FLAT HD 10-24 UNC X 3/4	2
22	013949-003	WASHER, #10 STAR, EXTERNAL TOOTH	2
23	011250-003	HEX NUT 10-24 UNC	2

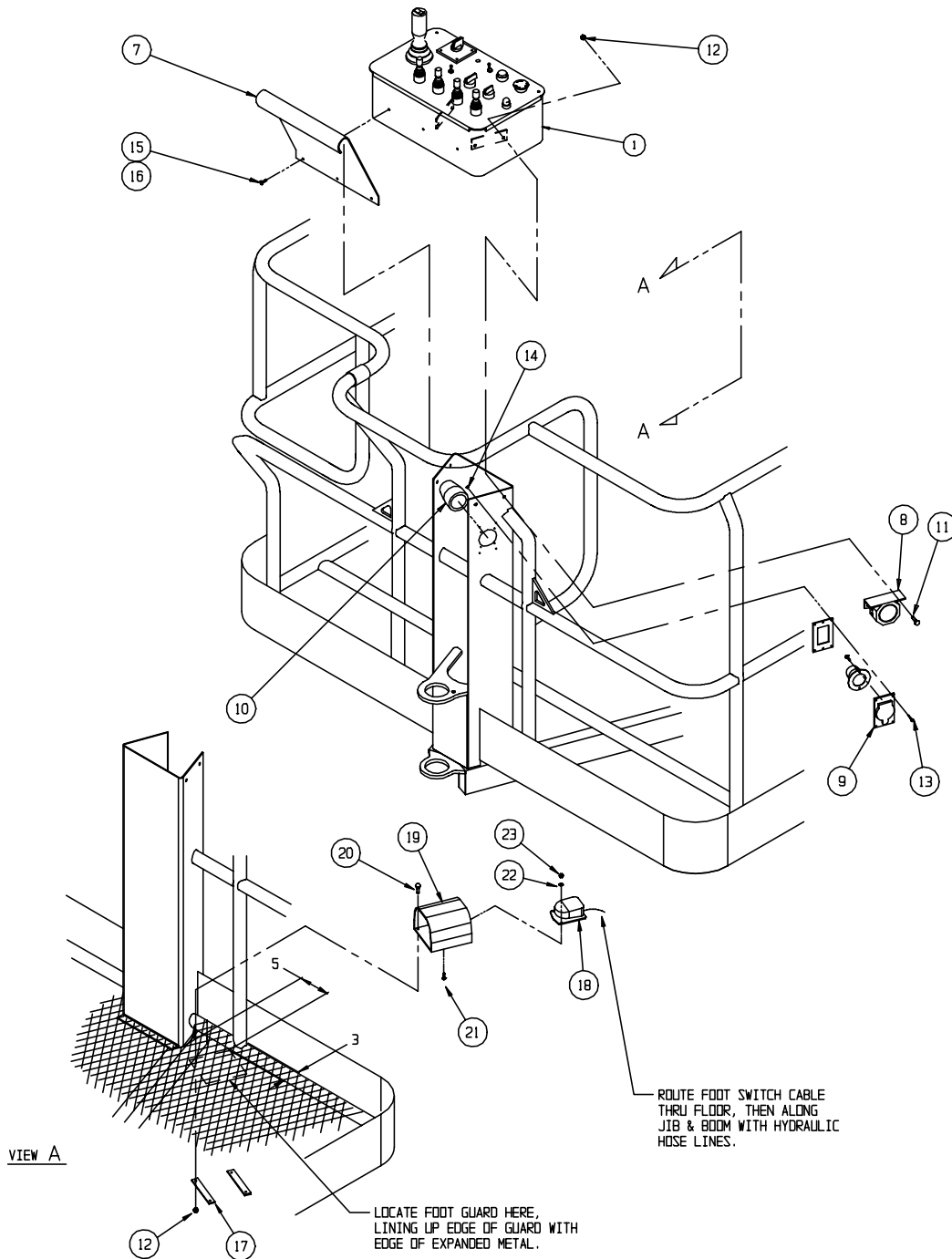


Controller Installation, Diesel

068339-008

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068329-007	CONTROLLER ASSY - DOM R/T (DIESEL)	1
7	068750-000	DECAL MOUNT	1
8	063778-001	ALARM	1
9	08942-001	FEMALE RECEPTACLE	1
10	029961-001	SEAL	1
11	011252-008	SCREW HHC 1/4-20 UNC X 1	4
12	011248-004	NUT HEX 1/4-20 UNC ESNA	8
13	011715-006	SCREW RD HD 6-32 UNC X 3/4	4
14	011248-047	NUT HEX 6-32 UNC ESNA	4
15	011709-006	SCREW RD HD 10-24 UNC X 3/4	3

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
16	011248-003	NUT HEX 10-24 UNC ESNA	3
17	068820-000	RETAINING STRAP-FOOTSWITCH	2
18	063906-000	FOOT SWITCH CLPR	1
19	064479-000	SWITCH GUARD, FOOT	1
20	011252-012	SCREW HHC 1/4-20 UNC X 1 1/2	4
21	066695-006	SCREW FLAT HD 10-24 UNC X 3/4	2
22	013949-003	WASHER, #10 STAR, EXTERNAL TOOTH	2
23	011250-003	HEX NUT 10-24 UNC	2



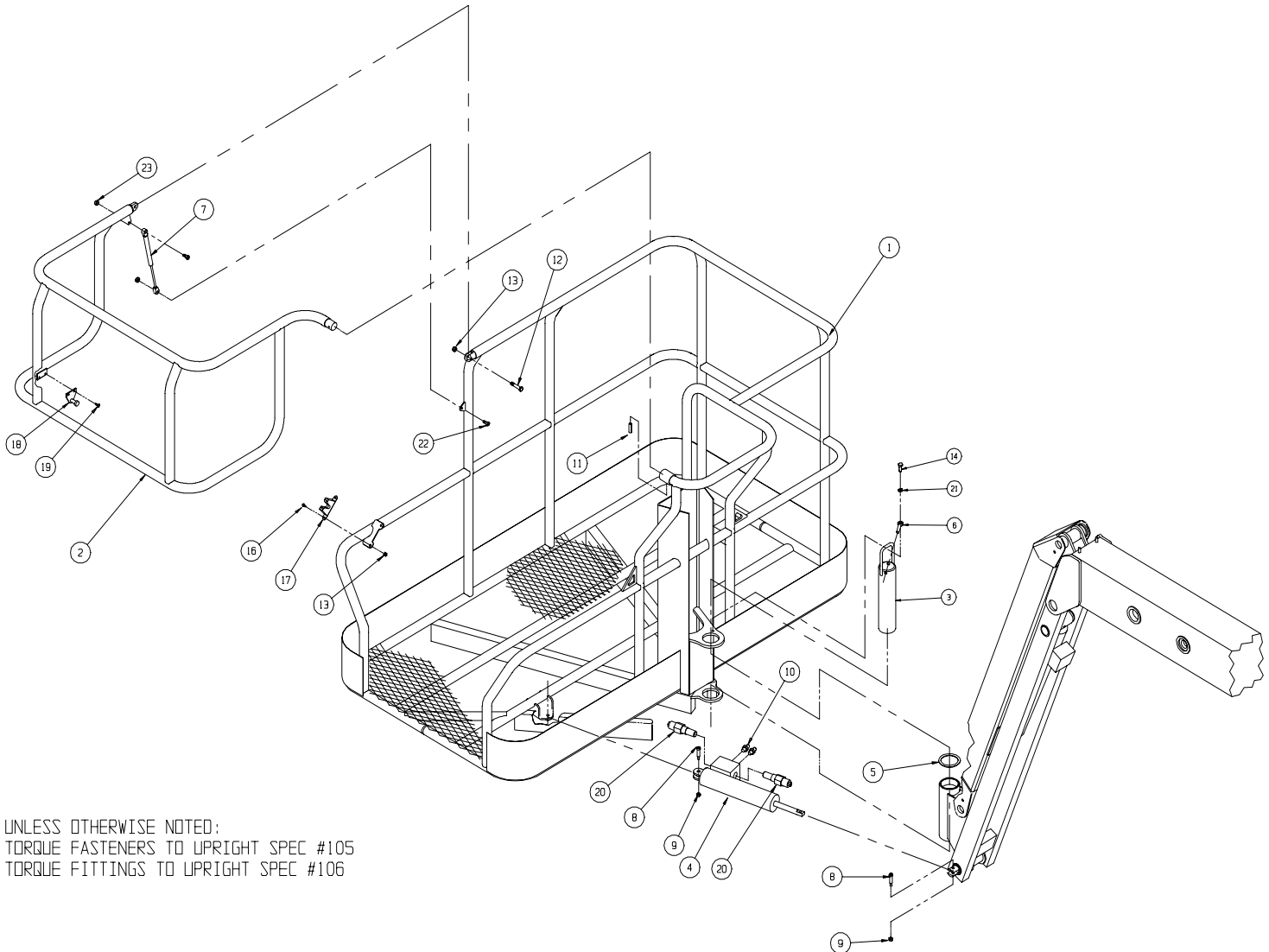
Platform 'B' Assembly

068325-001

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068500-001	CAGE "B" WELDMENT	1
2	068532-000	LIFT-UP GATE WELDMENT	1
3	068775-000	BASKET PIN WELDMENT	1
4	068457-000	CYLINDER, CAGE ROTATION	1
*	068457-010	SEAL KIT, CAGE ROTATE	1
5	068651-000	THRUST WASHER G32DU (MODIFIED)	1
6	065214-000	PIN RETAINER	1
7	063650-012	GAS SPRING	1
8	015936-010	SHOULDER BOLT	2
9	011248-005	LOCKNUT	2
10	011939-008	FITTING, 6MP-4MJ	2
11	011737-012	ROLLPIN 1/4" X 1-1/2"	1
12	011737-014	SCREW, HHC 1/4-20 X 1-3/4	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
13	011248-004	NUT HEX 1/4-20	3
14	011254-008	SCREW HHC 3/8-16 X 1	1
16	012553-006	SCREW SOC HD GR5 1/4-20 UNC X 3/4	2
17	068277-000	LATCH ROTARY	1
18	068806-000	STRIKER WELDMENT	1
19	011709-004	SCREW RND HD 10-24 UNC X 1/2	2
20	068778-014	VALVE COUNTERBALANCE, 1500 PSI	2
21	011238-006	LOCKWASHER 3/8 SPLIT	1
22	015936-005	SHOULDER BOLT 3/8 X 5/8 LG	2
23	11248-005	NUT, ESNA 5/16-18	2

* Not shown



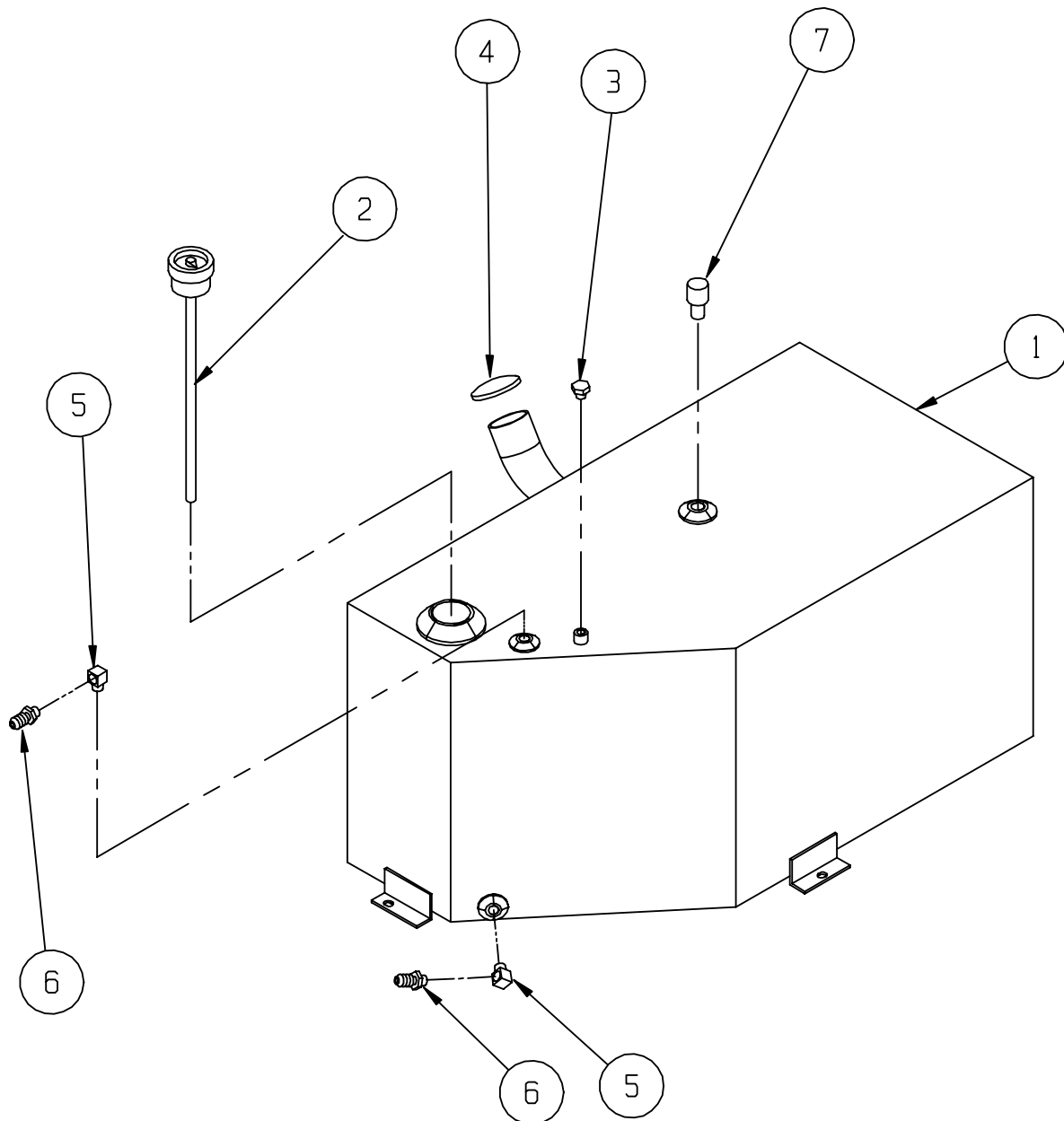
UNLESS OTHERWISE NOTED:
TORQUE FASTENERS TO UPRIGHT SPEC #105
TORQUE FITTINGS TO UPRIGHT SPEC #106

Fuel tank Assembly, Gas

109052-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068671-000	FUEL TANK	1
2	063982-003	FUEL GAGE	1
3	011919-002	PLUG 1/4	1
4	063929-001	CAP-NON VENTED	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
5	003495-000	FITTING, STREET ELBOW 1/4	2
6	010178-005	FITTING, BARBED 5/16	2
7	068711-000	BREATHER, GITS	1

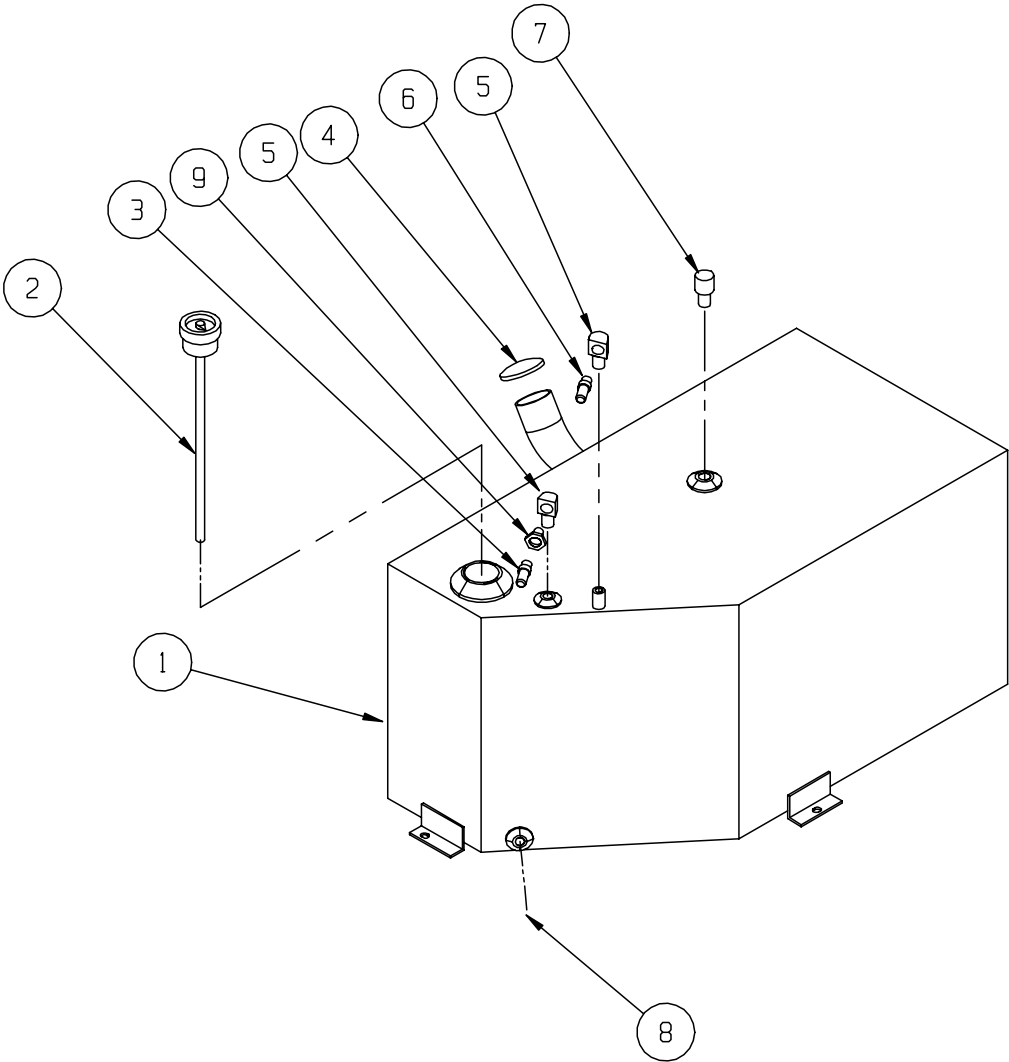


Fuel Tank Assembly, Diesel

068710-001

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068671-000	FUEL TANK	1
2	063982-003	FUEL GAGE	1
3	010178-001	FITTING, BARBED 1/8	1
4	063929-001	CAP-NON VENTED	1
5	003495-000	FITTING, STREET ELBOW 1/4	2

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
6	010178-005	FITTING, BARBED 1/4	1
7	068711-000	BREATHER, GITS	1
8	011919-002	FITTING, PLUG 1/4 HEX	1
9	003556-001	FITTING ADAPTER	1

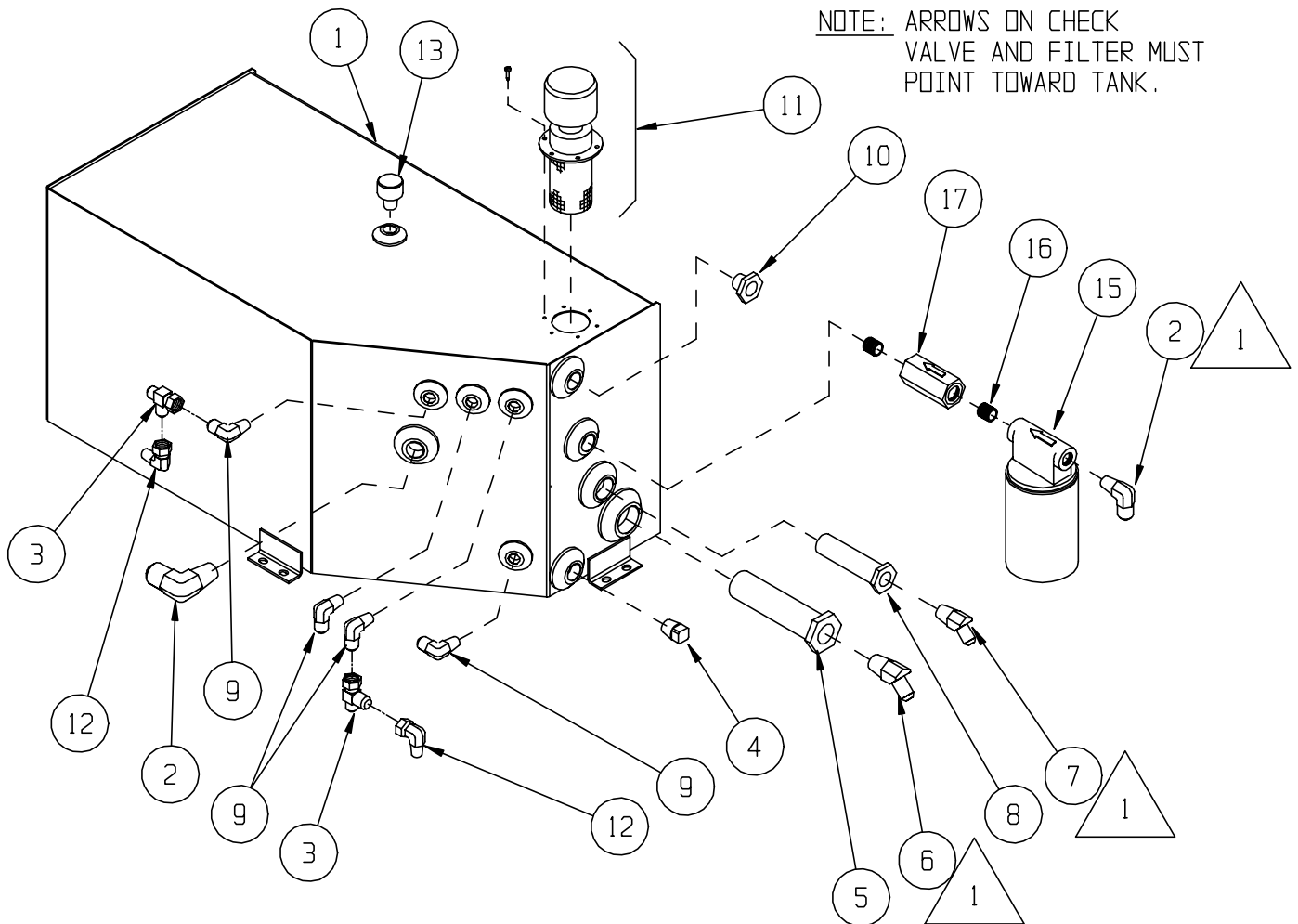


Hydraulic Tank Assembly

069205-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068995-000	HYDRAULIC RESERVOIR	1
2	011940-019	FITTING, 90° ELBOW 12MP-10MJ	2
3	020733-002	FITTING, TEE 6MJ-6MJ-6FJ	2
4	021305-007	PLUG, MAGNETIC	1
5	063935-000	STRAINER	1
6	013485-020	FITTING, 45° ELBOW 16MP-16MJ	1
7	013485-017	FITTING, 45° ELBOW 12MP-12MJ	1
8	061818-000	STRAINER	1
9	011940-010	FITTING, 90° ELBOW 6MP-6MJ	4

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
10	063979-006	SIGHT GUAGE	1
11	068840-000	FILLER BREATHER CAP & SCREEN	1
12	011937-003	FITTING, 90° ELBOW 6FJ-6MJ	2
13	068711-000	BREATHER, GITS	1
15	005154-001	FILTER, HYDRAULIC SPIN ON	1
*	005154-002	FILTER REPLACEMENT	1
16	012467-003	NIPPLE, PIPE 3/4 CLOSE	2
17	068809-000	CHECK VALVE	1



UNLESS OTHERWISE SPECIFIED:
TORQUE ALL FITTINGS AS PER UPRIGHT SPEC. # 106

1 THESE ELBOWS MUST
POINT DOWN.

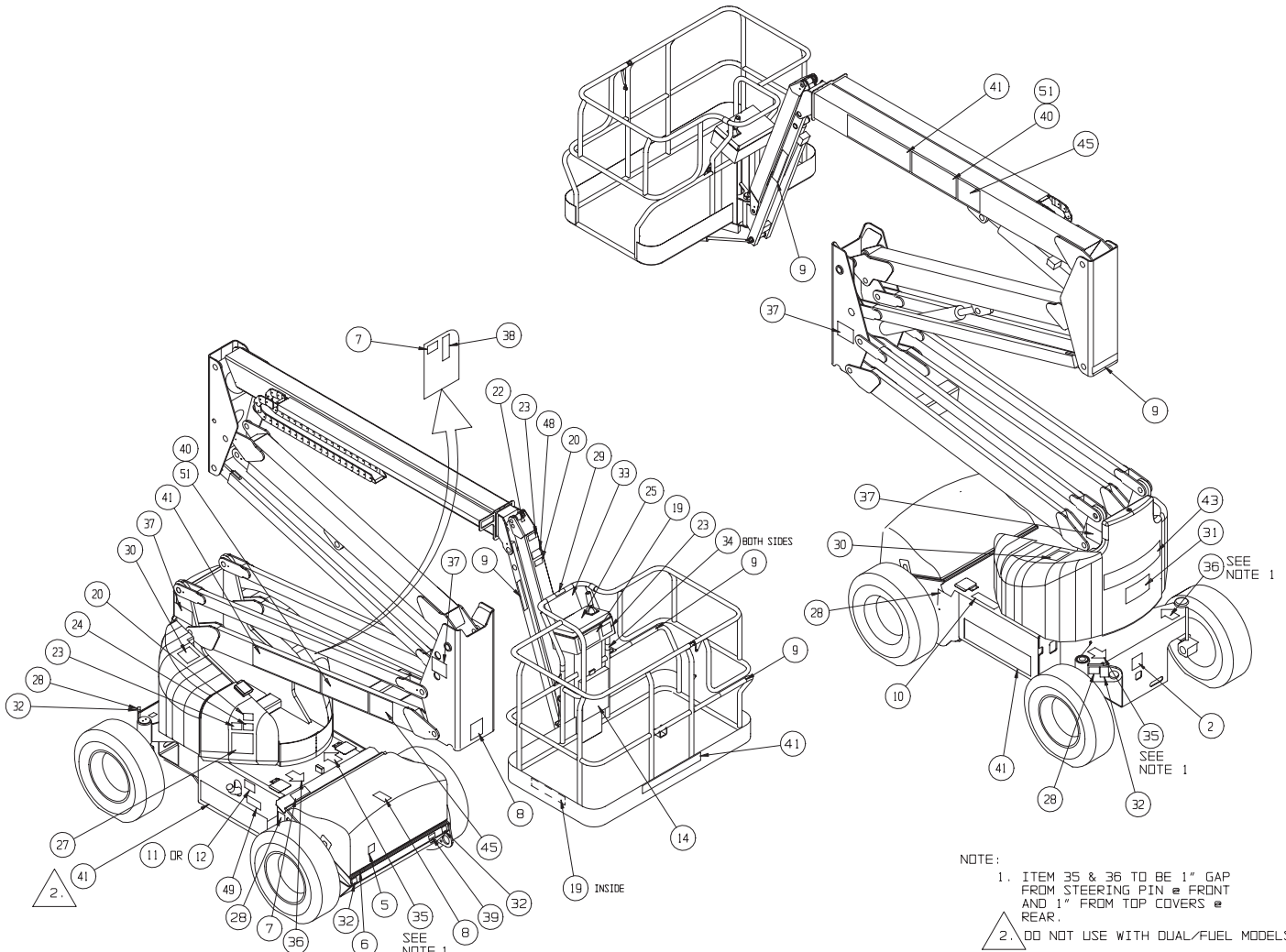
Label Kit, Gas

068335-004 - Gas

068335-005 - Diesel

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	
			GAS	DSL
2	061205-002	NAMEPLATE	1	1
5	066552-000	LABEL EXPLOSIVE GAS	1	1
6	005221-000	LABEL BATTERY LEVEL	1	1
7	066555-000	LABEL LIMIT SWITCH	2	2
8	066556-000	LABEL PINCH POINT	2	2
9	066553-001	LABEL PINCH POINT	5	5
10	060197-000	LABEL HYDRAULIC FLUID	1	1
11	027898-000	LABEL DIESEL FUEL	X	1
12	064166-000	LABEL UNLEADED FUEL	1	X
14	010076-001	LABEL ATTENTION	1	1
19	062557-012	MAX LOAD 500 Lb / 225 Kg	2	2
20	067822-001	LABEL GLOW INST.	X	2
22	064444-000	LABEL USA	1	1
23	066554-000	LABEL BEFORE OPERATION	3	3
24	068979-000	LABEL CHOCK WHEEL	1	1
25	068586-014	LABEL UPPER CONTROLS RT GAS	1	X
25	068586-013	LABEL UPPER CONTROLS RT DSL	X	1
27	068587-010	LABEL LOWER CONTROLS	1	1
28	066562-004	TIRE PSI 55 PSI	4	4

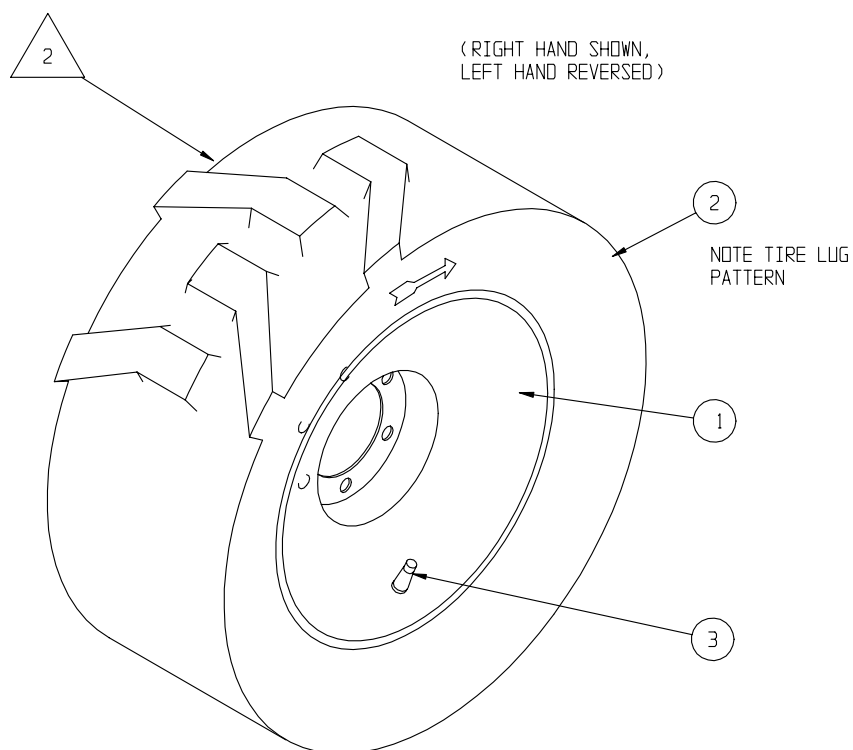
ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	
			GAS	DSL
29	068980-000	LABEL FOOT SWITCH MAY FLOOD	1	X
30	066568-000	LABEL CRUSHING HAZARD	2	2
31	064199-001	LABEL 4WD	1	1
32	068632-000	LABEL HOLD DOWN	4	4
33	068633-000	LABEL READ & UNDERSTAND	1	1
34	068635-000	LABEL HARNESS POINT	2	2
35	068637-000	LABEL ARROW YELLOW	2	2
36	068637-001	LABEL ARROW ORANGE	2	2
37	066553-004	LABEL PINCH POINT	4	4
38	068638-000	LABEL EMERGENCY LOWER	1	1
39	068639-000	LABEL POWER TO PLATFORM	1	1
40	068634-001	LABEL AB46	2	2
41	061683-005	LABEL UPRIGHT	X	5
43	061683-007	LABEL UPRIGHT	1	1
45	068984-000	LABEL RT	2	2
48	068649-000	LABEL, CAUTION- RAISE JIB BOOM	1	1
49	064189-001	LABEL, LIQUID WITHDRAWAL	X	1



Tire & Wheel Assembly

068327-004, -005

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	-004 RIGHT	-005 LEFT
			QTY.	QTY.
1	068881-000	WHEEL, 10.5 X 17.5 9 HOLES	1	
2	068880-000	TIRE, 14 - 17.5 NHS 8 PLY	1	
3	012282-001	VALVE STEM	1	

**NOTES:**

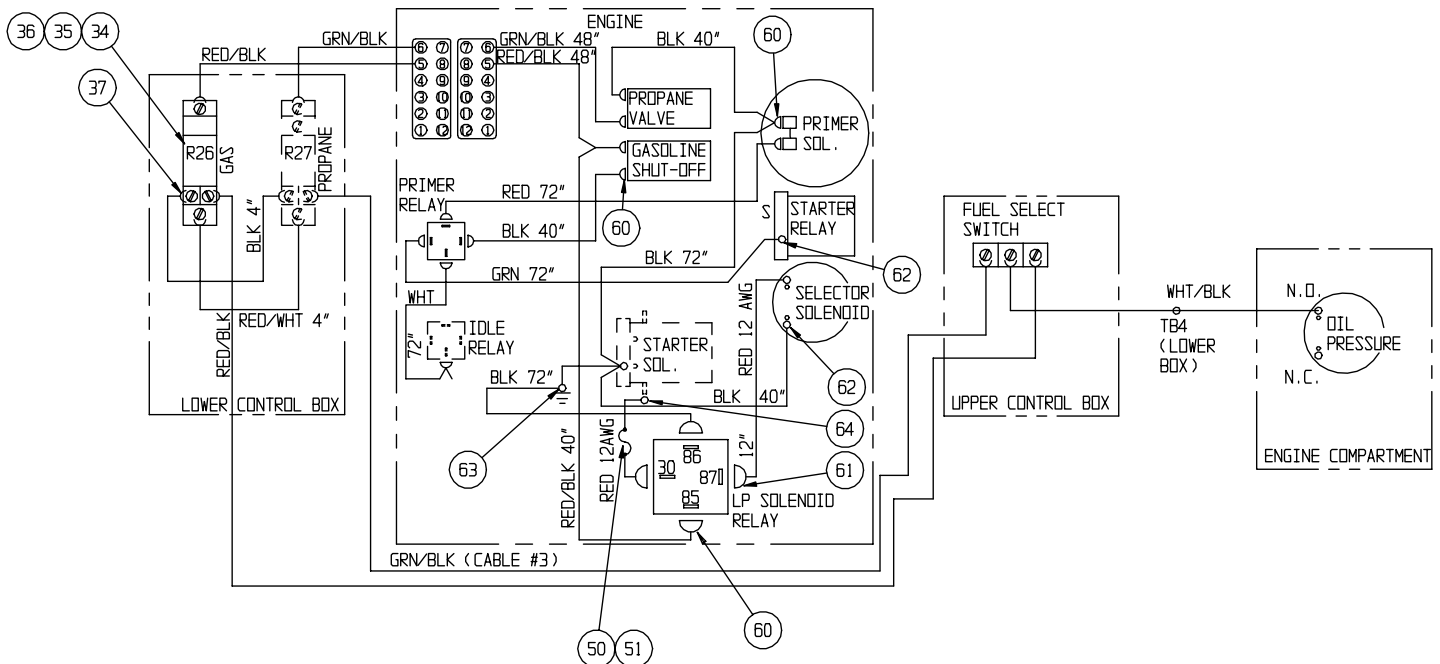
1. FILL TIRE & WHEEL ASSY WITH 110-115 FL. OZ. OF TRAC SEAL (OR EQUIV) TIRE SEALANT. INFLATE TO 55 PSI MIN TIRE PRESSURE. -TRAC SEAL REQ. WT.= 11.8 LBS (REF)

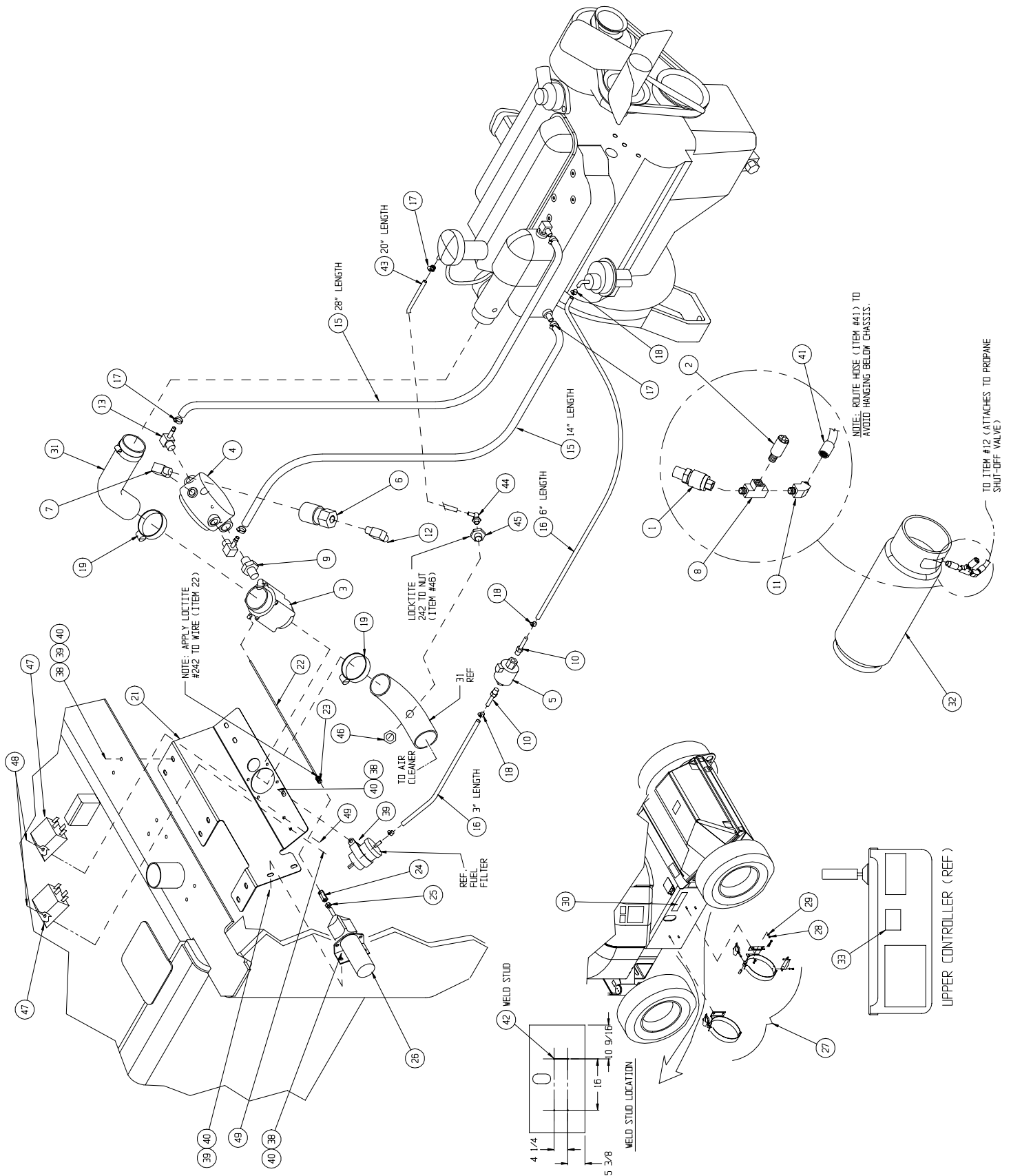
2. BRAND BACKSIDE OF TIRE/WHEEL ASSY AS FOLLOWS:
"UPRIGHT GKT"
SPACE TIRE SEALANT
LAST DIGIT OF YEAR WHEN TIRE WAS FILLED. LETTER CORRESPONDING TO MONTH: (JAN=A ETC)

Dual Fuel Conversion Kit

068990-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.	ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	067615-070	TANK ADAPTOR,	1	35	068756-001	RELAY, SINGLE POLE	1
2	067615-075	RELIEF VALVE,	1	36	067662-005	RETAINER CLIP	1
3	068990-020	LPG CARBURETOR	1	37	029610-006	TERMINAL, FORK	11
4	068990-021	VAPORIZER/REGULATOR	1	38	011252-006	SCREW, HHC. 1/4-20 UNC X 3/4 LG.	9
5	068990-029	SHUT-OFF VALVE, GASOLINE	1	39	011248-004	LOCKNUT, 1/4-20 UNC. ESNA	9
6	067615-052	SHUT-OFF VALVE, PROPANE	1	40	014996-004	WASHER 1/4" FLAT PLTD	11
7	067615-057	STREET ELBOW, 1/4 NPT BRASS	1	41	067615-047	HOSE, HIGH PRESSURE SUPPLY 42" LG.	1
8	067615-074	RUN TEE, 1/4 NPT BRASS	1	42	014250-003	WELDSTUD 3/8-16 X 1	4
9	068990-022	NIPPLE, REDUCING 1/2 NPT/3/8 NPT	1	43	068678-099	HOSE, 1/2" NEOPRENE	FT 1.67
10	068990-023	FITTING, BARB 1/8 NPT-1/4 I.D. HOSE	2	44	068957-005	ELBOW 1/2 MALE BARB TO 1/4 MPT	1
11	067615-056	FITTING, FLARE 3/8 TUBE-1/4NPT45° EL	1	45	068956-001	BUSHING, REDUCER	1
12	067615-058	FITTING, 90° 3/8 TUBE-1/4 NPT	1	46	029939-001	LOCKNUT, 3/8" CONDUIT	1
13	068990-024	FITTING, 90° BARB 1/4 NPT- 5/8 HOSE	2	47	068132-001	SWITCH, AUTO RELAY	2
15	068990-025	HOSE, 5/8 I.D.	FT. 4	48	011275-004	SCREW, MACH 10-32 X 1/2	2
16	067615-061	FUEL LINE 1/4" DIA.	FT. 2	49	011249-003	NUT, HEX ESNA 10-32	2
17	068990-026	HOSE CLAMP, 5/8" DIA.	6	50	029702-000	FUSE HOLDER	1
18	067615-064	HOSE CLAMP, 5/16" DIA.	4	51	029704-025	FUSE - 25 AMP	1
19	068990-027	HOSE CLAMP, 2 1/2" DIA.	2	52	029452-099	WIRE, 16 GA. BLK	22 FT
21	068990-014	MOUNTING BRACKET	1	53	029454-099	WIRE, 16 GA. RED	6 FT
22	069202-000	S.S. WIRE 26 GA. (Ø.063) X 12" LG.	1	54	029451-099	WIRE, 16 GA. WHITE	6 FT
23	069200-000	SET SCREW, (MODIFIED PER PRINT)	1	55	029478-099	WIRE, 16 GA. RED/BLACK	7.5 FT
24	068987-004	COUPLING NUT 1/4-28 UNF	1	56	029457-099	WIRE, 16 GA. GREEN	6 FT
25	020495-004	JAM NUT 1/4-28 UNF.	1	57	005491-099	WIRE, 16 GA. GREEN/BLACK	4 FT
26	068990-015	SOLENOID, TROMBETTA #D610-B1V12	1	58	029352-099	WIRE, 16 GA. RED/WHITE	.5 FT
27	068296-010	MTG. BRKT, PROPANE TANK	1	59	029470-099	WIRE, 12 GA. RED	7 FT
28	011248-006	LOCKNUT, 3/8-16 UNC ESNA	4	60	029931-003	CONN FEMALE PUSH 16-14 1/4"	12
29	011240-006	WASHER, 3/8" FLAT	4	61	029616-003	CONN FEMALE 10-12 1/4"	2
30	064189-001	LABEL, LIQUID WITHDRAWAL	1	62	029601-039	CONN RING 16-14 #10	3
31	068990-012	HOSE, AIR INTAKE (2 PARTS)	1	63	029601-014	CONN RING 16-14 1/4"	1
32	027934-003	TANK, PROPANE	1	64	029601-040	CONN RING 16-14 5/16"	1
33	064421-000	LABEL,	1				
34	067662-001	SOCKET, RELAY (SINGLE POLE)	1				



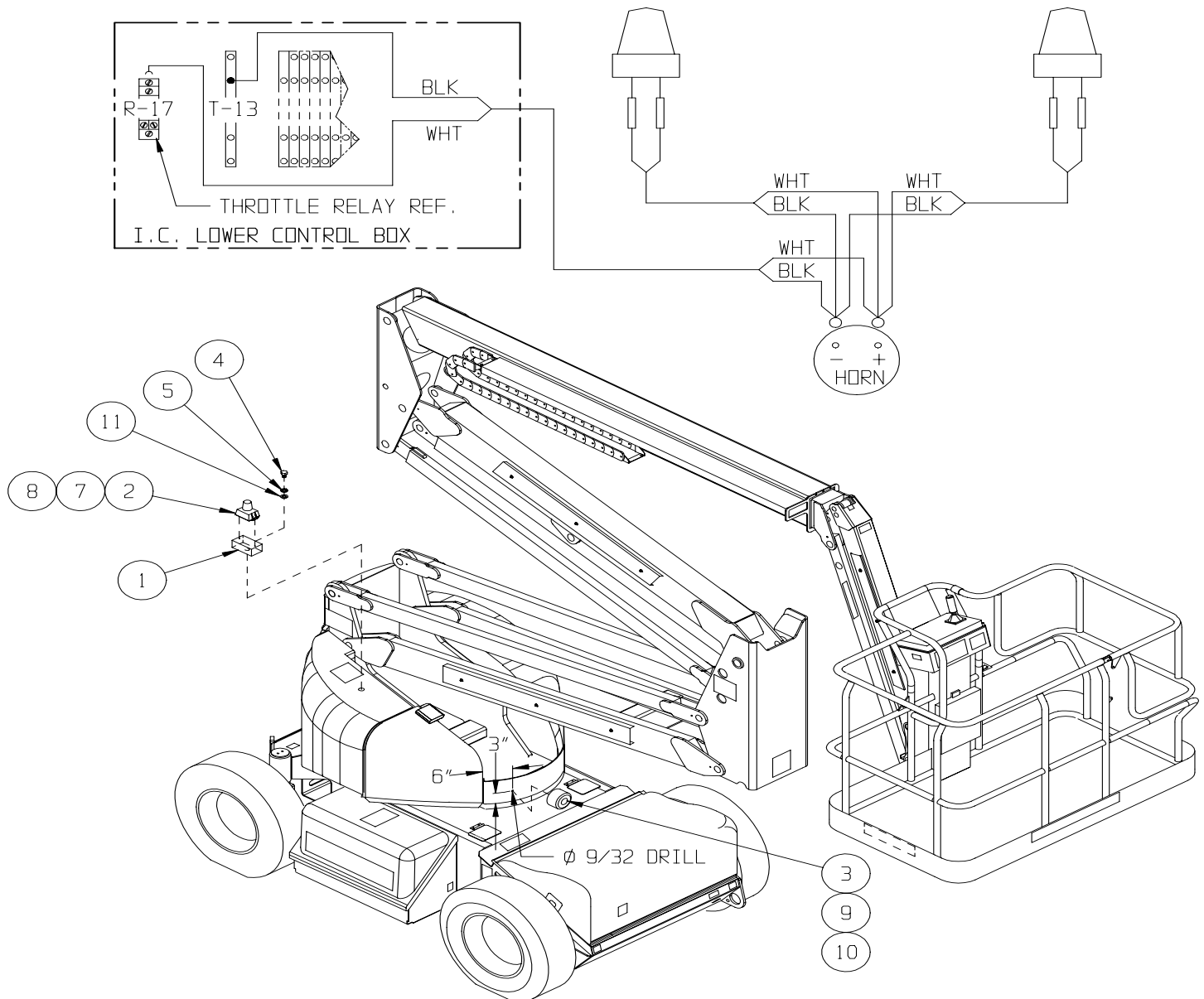


Motion Alarm Option

068294-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068817-000	STROBE MOUNT WELDMENT	2
2	012848-004	FLASHING STROBE LIGHT	2
3	066807-004	HORN	1
4	011258-008	SCR. HHC 3/4-10 UNC X 1	2
5	011238-016	WASHER, SPLIT LOCK	2
6	029496-099	WIRE, C COND. 16 GA.	8 FT.

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
7	011709-004	SCREW # 10-24 UNC X 1/2" LG	4
8	011248-003	LOCKNUT # 10-24 UNC ESNA	4
9	011252-006	SCREW, HHC 1/4-20UNC X 3/4" LG.	1
10	011238-004	LOCKWASHER, 1/4" SPLIT RING	1
11	011240-012	WASHER FLAT STD 3/4	2



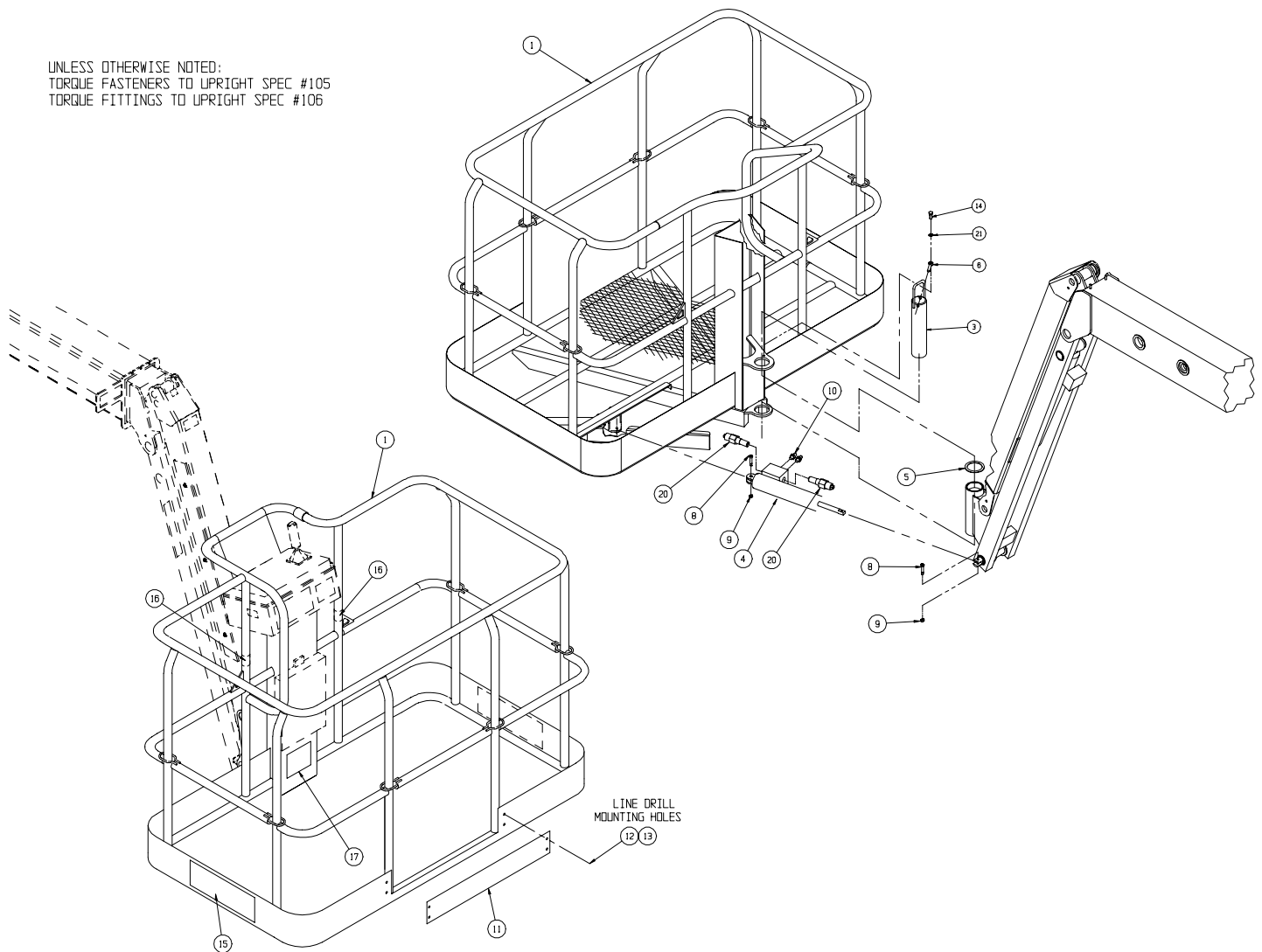
Platform 'A' Option

068325-000

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068500-000	CAGE "A" WELDMENT	1
3	068775-000	BASKET PIN WELDMENT	1
4	068457-000	CYLINDER, CAGE ROTATION	1
*	068457-010	SEAL KIT	
5	068651-000	THRUST WASHER G32DU (MODIFIED)	1
6	065214-000	PIN RETAINER	1
8	015936-010	SHOULDER BOLT	2
9	011248-005	LOCKNUT	2
10	011939-008	FITTING, 6MP-4MJ	2
11	068821-003	TOEBOARD, CAGE ENTRY - EURO	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
12	011252-006	SCREW HHC GR5 1/4-20 X 3/4	4
13	011248-004	NUT HEX ESNA 1/4-20	4
14	011254-008	SCREW HHC 3/8-16 X 1	1
15	061683-005	LABEL UPRIGHT	2
16	068635-000	LABEL HARNESS POINT	2
17	062557-012	LABEL MAX LOAD 500 LBS	1
20	068778-014	VALVE COUNTERBALANCE, 1500 PSI	2
21	011238-006	LOCKWASHER 3/8 SPLIT	1

UNLESS OTHERWISE NOTED:
TORQUE FASTENERS TO UPRIGHT SPEC #105
TORQUE FITTINGS TO UPRIGHT SPEC #106



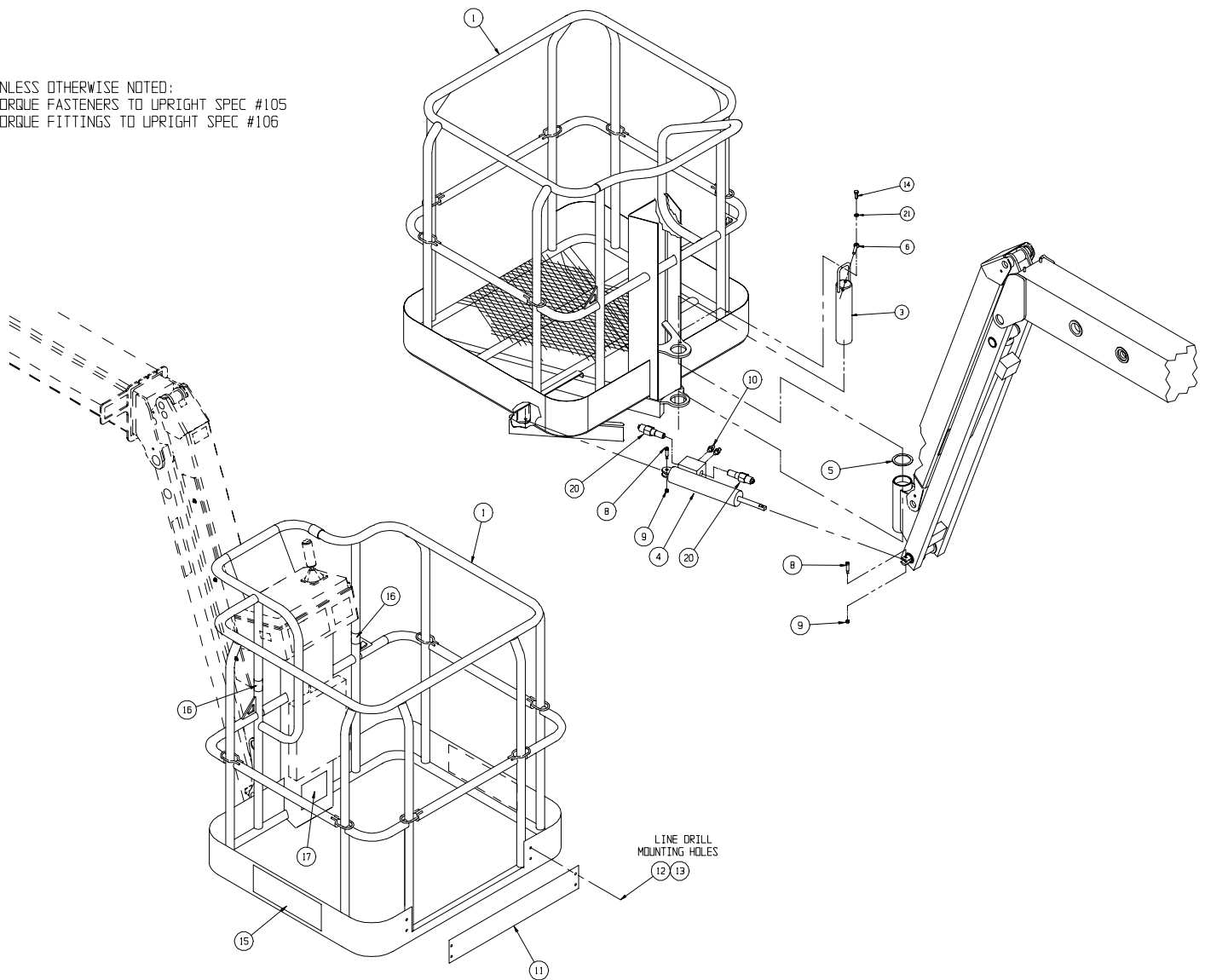
Four Foot Platform Option

068325-003

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
1	068500-003	CAGE 4 FT WELDMENT	1
3	068775-000	BASKET PIN WELDMENT	1
4	068457-000	CYLINDER, CAGE ROTATION	1
*	068457-010	SEAL KIT	
5	068651-000	THRUST WASHER G32DU (MODIFIED)	1
6	065214-000	PIN RETAINER	1
8	015936-010	SHOULDER BOLT	2
9	011248-005	LOCKNUT	2
10	011939-008	FITTING, 6MP-4MJ	2
11	068821-003	TOEBOARD, CAGE ENTRY - EURO	1

ITEM	PART NO.	PART/MATERIAL DESCRIPTION	QTY.
12	011252-006	SCREW HHC GR5 1/4-20 X 3/4	4
13	011248-004	NUT HEX ESNA 1/4-20	4
14	011254-008	SCREW HHC 3/8-16 X 1	1
15	061683-005	LABEL UPRIGHT	2
16	068635-000	LABEL HARNESS POINT	2
17	062557-012	LABEL MAX LOAD 500 LBS	1
20	068778-014	VALVE COUNTERBALANCE, 1500 PSI	2
21	011238-006	LOCKWASHER 3/8 SPLIT	1

UNLESS OTHERWISE NOTED:
TORQUE FASTENERS TO UPRIGHT SPEC #105
TORQUE FITTINGS TO UPRIGHT SPEC #106



UpRight

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UpRight

P/N 068344-001-R1
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