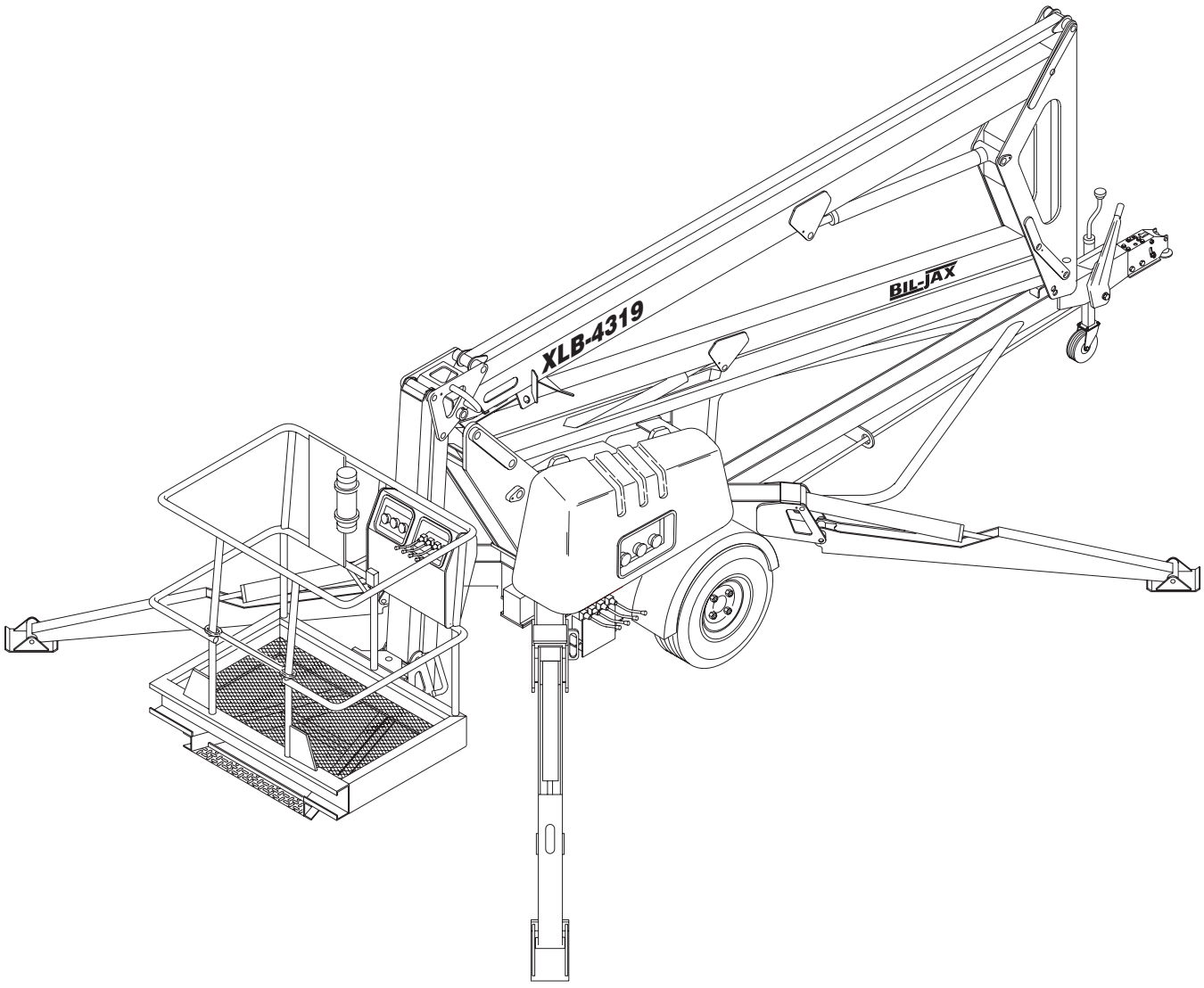
BIL-JAX
A STEP ABOVE®
AERIAL WORK PLATFORMS

Operation and Maintenance Manual

XLB-4319

Hydraulic Boom Lift



B33-01-0080

BOOM PERSONNEL LIFT

This equipment is designed and manufactured in compliance with the duties, responsibilities, and standards set forth for manufacturers in the ANSI 92.2 standard in effect at the time of manufacture.

This equipment will meet or exceed applicable OSHA codes and ANSI A92.2 standards when used in accordance with sections 7, 8, 9, 10 & 11 of ANSI A92.2 and all other manufacturer's recommendations.

It is the responsibility of the user of this equipment to follow all applicable ANSI, OSHA, Federal, State, and local codes and regulations that govern the safe operation of this equipment.

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PREFACE

The purpose of this manual is to provide a thorough understanding of the XLB-4319 Hydraulic Boom Lift operation and controls. Read the safety and operating instructions in this manual and become familiar with the location and use of all controls.

Follow all warnings, cautions, and instructions in this manual and any attached to and supplied with the boom lift. All OSHA, ANSI, state, and local codes and regulations concerning this equipment should obtained, read, and thoroughly understood before attempting to operate this equipment.

To ensure proper and safe use of this equipment, only trained and qualified personnel should operate and maintain the boom lift.

SAFETY NOTES

This manual contains DANGERS, WARNINGS, CAUTIONS, and NOTES that must be followed to prevent the possibility of improper service, personnel injury or death, and damage to equipment.

DANGER

Dangers warn of equipment operation near electrical power lines that could lead to personal injury or death.

WARNING

Warnings describe conditions or practices that could lead to personal injury or death.

CAUTION

Cautions provide information important to prevent errors that could damage machine or components.

NOTE: Notes contain additional information important to a procedure.

1
Safety

1-1 INTRODUCTION

Familiarity and proper training are required for the safe operation of mechanical equipment. Equipment operated improperly or by untrained personnel can be dangerous. Read the operating instructions in this manual and become familiar with the location and proper use of all controls. Inexperienced operators should receive instruction from someone familiar with the equipment before being allowed to operate the machine. The use of intelligence and common sense in the operation of mechanical equipment is the best practice in any safety policy. Be professional and always observe the safety procedures set forth in this manual.

All OSHA, ANSI, state, and local codes and regulations pertaining to this equipment should be obtained, read, and thoroughly understood before attempting to operate this equipment. Persons under the influence of drugs, alcohol, or prescription medication should not be on or near this equipment. Common sense should be implemented at all times during the use of this equipment. Do not operate this equipment in areas where the equipment or user may come in contact with a live power source.

The information contained herein is not to be considered as legal advice and is intended for informational purposes only. This information is offered to alert Bil-Jax customers to procedures that may be of concern to them.

This information is not intended to be all inclusive and is to be followed in the use of Bil-Jax equipment only.

For any questions concerning the safe use of this equipment, call 800-937-0540 before operating.

1-2 BEFORE OPERATION

Ensure the following general safety precautions are followed before operating the XLB-4319 Hydraulic Boom Lift.

- ALWAYS survey the usage area for potential hazards such as untamped earth fills, unlevel surfaces, overhead obstructions, and electrically charged conductors or wires. Be aware of any potential hazards and always consider what could happen. Watch for moving vehicles in the operating area.
- ALWAYS read, understand, and follow the procedures in this manual before attempting to operate equipment.
- ALWAYS inspect the equipment for damaged or worn parts. Check for cracked welds, hydraulic leaks, damaged wiring, loose wire connectors, damaged outriggers, low tire pressure, uneven tire wear, or tire damage. Also check for any improper operation. NEVER operate equipment if damaged in any way. Improperly operating equipment must be repaired before using.
- ALWAYS wear proper clothing for the job. Wear protective equipment as required by federal, state, or local regulations. The operator MUST wear a safety harness and lanyard.
- ALWAYS locate, read, and follow all directions and warnings displayed on the equipment.
- ALWAYS inspect the equipment for “DO NOT USE” tags. NEVER use equipment tagged in this way until all repairs are made and all “DO NOT USE” tags are removed by authorized maintenance personnel.
- ALWAYS make sure the basket and outrigger shoes are free of mud, grease, or other slippery material to reduce the possibility of slipping.
- NEVER allow improperly trained personnel to operate this equipment. Only trained and authorized personnel shall be allowed to operate this equipment.
- NEVER operate this equipment if you are under the influence of alcohol or drugs, or if you feel ill, dizzy, or unsteady in any way. Operators must be physically fit, thoroughly trained, and not easily excitable.
- NEVER modify, alter, or change the equipment in any way that would affect its original design or operation in any way.
- NEVER operate this equipment in ways for which it is not intended.

1-3 DURING OPERATION

Ensure the following general safety precautions are followed during the operation of the XLB-4319 Hydraulic Boom Lift.

⚠ DANGER

This machine is not insulated for use near electrical power lines and DOES NOT provide protection from contact with or close proximity to any electrically charged conductor. Operator must maintain safe clearances at all times (10 feet minimum) and always allow for platform movement such as wind induced sway. Always contact the power company before performing work near power lines. Assume every line is hot. Remember, power lines can be blown by the wind.

Refer to Table 1-1 for minimum safe approach distances between machine and electrical power lines.

Table 1-1. Minimum Safe Approach Distances

Voltage Range (Phase to Phase)	Minimum Safe Approach Distance	
	(Feet)	(Meters)
0 to 300V	Avoid Contact	
Over 300V to 50KV	10	3.05
Over 50KV to 200KV	15	4.60
Over 200KV to 350KV	20	6.10
Over 350KV to 500KV	25	7.62
Over 500KV to 750KV	35	10.67
Over 750KV to 1000KV	45	13.72

- ALWAYS position lift far enough away from power sources to ensure that no part of the lift can accidentally reach into an unsafe area. This includes full extension of the boom through 360 degrees rotation.
- ALWAYS operate only on a firm and level surface. NEVER use on surfaces that do not support the equipment with its rated load capacity and the resulting force exerted on the outriggers during boom extension and rotation.
- ALWAYS keep yourself and all personnel away from potential pinch or shear points.
- ALWAYS report any misuse of equipment to the proper authorities. Horseplay is prohibited.
- ALWAYS maintain good footing on the work platform. NEVER wear slippery soled shoes.
- ALWAYS make certain all personnel are clear and there are no obstructions before repositioning basket.
- ALWAYS cordon off area around the outriggers to keep personnel and other equipment away from it while in use.
- ALWAYS stay clear of wires, cables, and other overhead obstructions.
- ALWAYS engage the boom travel locking pins before towing the trailer.

- NEVER allow electrode contact with any part of the basket if welding is being performed from the platform.
- NEVER use without the outriggers fully extended and firmly based.
- NEVER override or by-pass manufacturer's safety devices.
- NEVER attach a safety harness to an adjacent structure, pole, or equipment while working from the boom platform.
- NEVER move unit with a person or materials on board.
- NEVER try to move the trailer with the boom extended.
- NEVER stand or sit on cage bars. Work only within the work cage and do not lean out over the cage to perform work.
- NEVER attempt to increase working height with boxes, ladders, or other means.
- NEVER operate this equipment when exposed to high winds, thunderstorms, ice, or any other weather conditions that would compromise operator safety.
- NEVER allow ropes, electric cords, hoses, etc. to become entangled in the equipment when the basket is being raised or lowered.
- NEVER exceed manufacturer's load limits or use the lift as a crane for lifting heavy materials. Make sure all tools and equipment are safely stowed.
- NEVER exceed load ratings by transferring loads to the basket at elevated heights.
- NEVER use cage to carry materials and never allow overhang of materials when raising or lowering the basket.
- NEVER push or pull with the boom or basket and NEVER use the boom to lift any part of the trailer.
- NEVER use the boom or basket to place a “dead man” load against any structure, materials, or equipment.
- NEVER climb up or down boom.
- NEVER leave the keys in the boom lift while unattended or not in use.

1-4 MAINTENANCE SAFETY

Ensure the following safety precautions are observed whenever maintenance is performed on the XLB-4319 Hydraulic Boom Lift.

General Maintenance

- ALWAYS perform maintenance procedures according to manufacturer's requirements. NEVER short change maintenance procedures.
- ALWAYS check hydraulic system. Make sure all lines, connectors, and fittings are tight and in good condition.
- ALWAYS turn the key switch off before connecting or disconnecting wiring to or from valve solenoids or other load devices.
- ALWAYS disconnect power to the hydraulic pump drive motor before making electrical checks of the hydraulic valves.
- ALWAYS keep all mechanisms properly adjusted and lubricated according to maintenance schedule and manufacturer’s specifications.
- ALWAYS perform a function check of operating controls before each use and after repairs have been made.
- ALWAYS locate and protect against possible pinch points prior to performing maintenance and repairs.
- ALWAYS use factory-approved parts to repair or maintain this equipment. If this equipment is rebuilt, retesting is required in accordance with factory instructions.
- NEVER allow water or foreign particles into the DC electric motor housing. Ingestion of water or foreign particles may cause serious damage to the motor. If the motor gets wet, oven dry the motor to remove all moisture before operating; consult motor manufacturer for drying instructions.
- NEVER test or operate the hydraulic components when another person is near the equipment.
- NEVER add unauthorized fluids to the hydraulic system or battery. Check original manufacturer specifications.
- NEVER exceed the manufacturer's recommended relief valve settings.
- NEVER touch or allow metal tools to contact static discharge sensitive electronic components. ALWAYS use static discharge prevention mats and grounding devices when handling electronic components.
- NEVER tamper with cylinder counter balance valves. Contact the Bil-Jax Service Department at 800-537-0540 if the cylinder counter balance valves need adjusting.
- NEVER attempt repairs you do not understand. Consult manufacturer if you have any questions regarding proper maintenance, specifications, or repair.

Battery Maintenance

Ensure the following general safety precautions are followed whenever performing battery maintenance on the XLB-4319 Hydraulic Boom Lift.

- ALWAYS check battery acid level daily on the DC model boom lift. Check battery test indicator for proper state of charge on maintenance free batteries before using lift.
- ALWAYS wear safety glasses when working near battery.
- ALWAYS avoid contact with battery acid. Battery acid causes serious burns. Avoid contact with skin or eyes. If accidental contact occurs, flush with water and consult a physician immediately.
- ALWAYS disconnect ground cable first when removing battery.
- ALWAYS connect ground cable last when installing battery.
- ALWAYS charge batteries in open, well-ventilated areas.
- NEVER smoke when servicing battery.
- NEVER allow batteries to overcharge and boil.
- NEVER short across battery posts to check for current. NEVER break a live circuit at battery.
- NEVER jump start other vehicles using boom lift battery.

1-5 DAMAGED EQUIPMENT POLICY

Safety Statement

At Bil-Jax, we are dedicated to the safety of all users of our products. Therefore, all Bil-Jax lifts are designed, manufactured and tested to comply with current applicable Federal OSHA and ANSI codes and regulations.

Damage Policy

There may be occasions when a Bil-Jax lift is involved in an incident that results in structural damage to the lift. This can seriously compromise the ability of the lift to perform in a safe manner. Therefore, whenever a Bil-Jax lift is damaged structurally or when there is the possibility of structural damage (this damage may be internal and is not always visible to the naked eye), Bil-Jax requires that the lift be returned to our facility at 125 Taylor Parkway, Archbold, Ohio, for reconditioning. If you have any questions concerning what constitutes structural damage, please call the Bil-Jax Service Department at 800-537-0540.

Damage Repair Notice

There may be occasions when a Bil-Jax lift is involved in an incident resulting in non-structural damage. When this occurs and repairs are made by the owner or area distributor, please notify Bil-Jax of these non-maintenance repairs and request a repair form to be filled out and returned to Bil-Jax.

Bil-Jax, Inc.
125 Taylor Parkway
Archbold, Ohio 43502

Reporting Safety Defects

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Bil-Jax, Inc.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in any individual problems between you, your dealer, or Bil-Jax, Inc.

To contact NHTSA you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (366-0123 in Washington, DC area) or write to:

NHTSA
U.S. DEPARTMENT of TRANSPORTATION
400 7th Street SW, (NSA-11)
Washington, DC 20590

You can also obtain other information about motor vehicle safety from the Hotline.

2
Introduction

2-1 GENERAL DESCRIPTION

The XLB-4319 Hydraulic Boom Lift (Figure 2-1) is designed to position personnel with their tools and equipment at overhead work locations. The work basket load capacity is 450 lbs. During all boom operations, the unit is supported by four extended outriggers.

Two versions of the XLB-4319 boom lift are available – gasoline powered or battery powered. On both versions the hydraulic power unit includes a reservoir, pump, and control valves. Three hydraulic cylinders elevate the lower boom, upper boom, and jib boom. A hydraulic motor and worm gear rotates the boom 360° around a vertical axis.

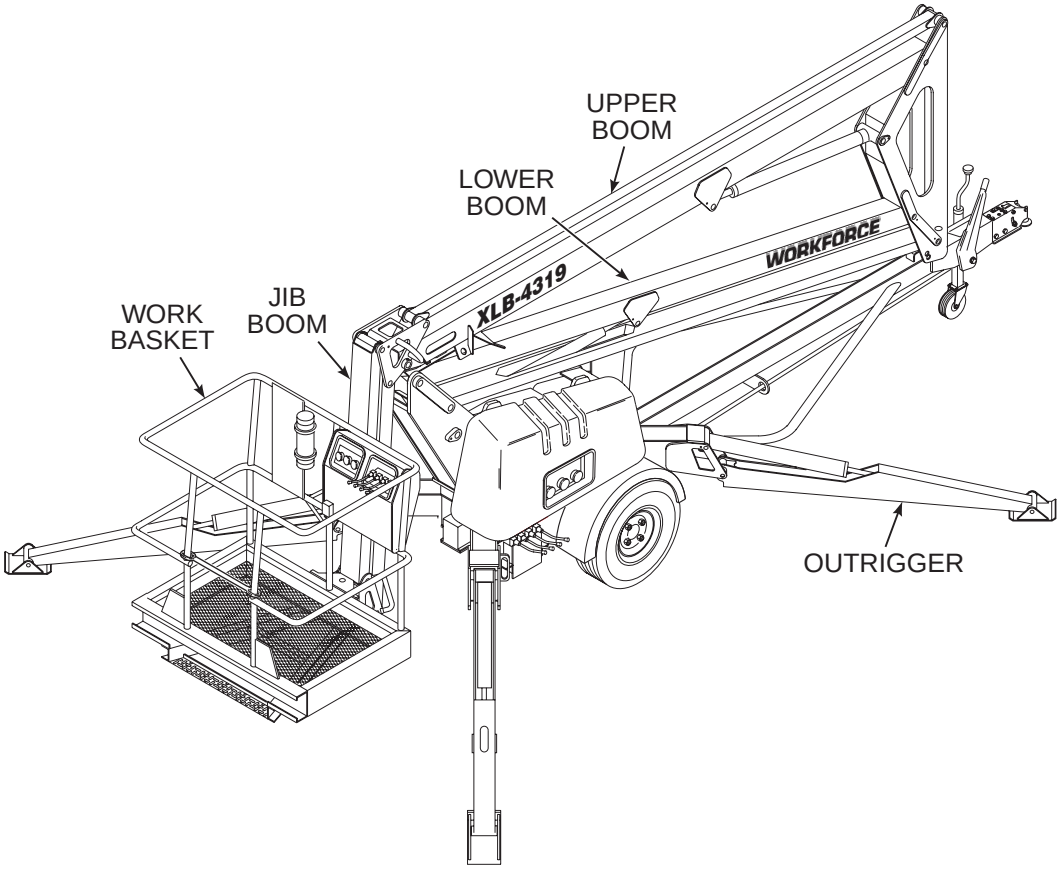


Figure 2-1. XLB-4319 Hydraulic Boom Lift

The gasoline powered boom lift (gas model) uses a 4-cycle, 8-horsepower Honda engine. The engine drive shaft is directly coupled to the hydraulic pump. A 12 Volt DC storage battery powers the engine starter circuit. An auxiliary voltage regulator/rectifier provides up to 18 Amps charge current while the engine is running.

The battery powered boom lift (DC model) uses a 24 Volt, 39 Amp, one horsepower, DC motor to drive the hydraulic pump. The DC motor is powered by four 6 Volt DC, 245 Amp-hour, deep charge batteries connected in series. A 40 Amp, automatic, on-board battery charger is provided for recharging the batteries at the end of each work period.

The boom lift is equipped with basket and ground station control panels (Figure 2-2). The control panels include motion enable pushbuttons and proportional hydraulic valves for controlling the direction and speed of boom lift and rotation. The gas model basket station control panel includes an engine start pushbutton. Boom elevation and rotation controls are operational only when the outriggers are correctly extended and the moving boom sections are within a programmed safe operating zone.

GROUND STATION CONTROLS BASKET STATION CONTROLS

Figure 2-2. Basket and Ground Station Controls

Only one boom motion is permitted at a time, and only as long as the boom is within the safe operating zone (Figure 2-3). When a selected boom motion reaches a safe operating limit, the boom motion ceases and another boom motion must be selected within the safe operating zone.

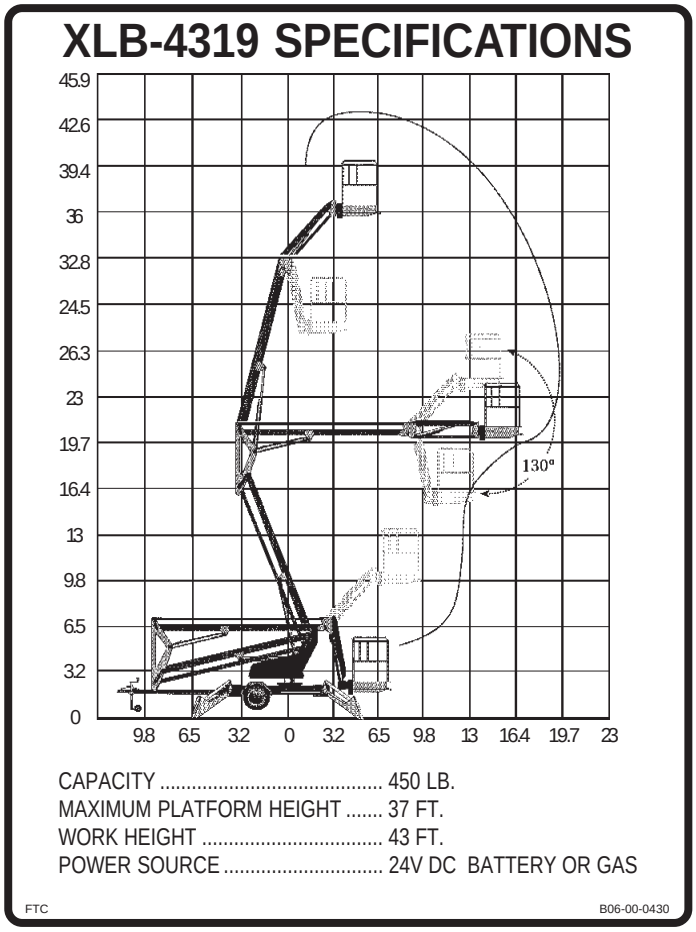


Figure 2-3. Safe Operating Zone

Outrigger load sensing interlocks and interlock safety switches prevent all boom lifting operations until the four outriggers are properly extended, the trailer is level, and the full weight of the boom lift is loaded onto the outriggers. An interlock prevents the retracting of any outrigger while the upper or lower boom is raised two inches (50 mm) or more.

Boom elevation speeds are adjustable from zero to 5.3 inches per second (0 to 27 ft/min). A hydraulic hose failure at either retract-cylinder port will cause a counterbalance valve to stop the return oil flow. It is strongly recommended that no one adjust or tamper with these safety devices. If service is required, please notify Bil-Jax for instructions.

Emergency lowering of the basket is by manual valve plungers on the upper and lower boom lift cylinders or by manual operation of a hand pump in the basket. Firmly pushing in and holding a valve plunger manually retracts the boom lift cylinder. Smooth pumping of the hand pump while engaging a single hydraulic valve lever enables boom operation in case of a hydraulic power failure.

The XLB-4319 Hydraulic Boom Lift cylinders will not rust or corrode during storage since the cylinder rod is fully immersed in oil. It is important that the cylinder rods be kept clean and undamaged for the protection of the cylinder head packings.

2-2 SPECIFICATIONS

Boom Lift Work Platform

Model Number: XLB-4319 Serial Number _____

Manufactured by: Bil-Jax, Inc.
125 Taylor Parkway
Archbold, Ohio 43502
800-537-0540

Table 2-1. Specifications

Feature	Data
Rated Platform Load	450 lbs (204 kg) total
Maximum Work Height	43 ft (13.1 m)
Extended Basket Height	37 ft (11.3 m)
Maximum Outreach	19 ft (9.8 m)
Elevation Rate, Nominal	5.3 in./sec (135 mm/sec) [26.7 ft/min (8.14 m/min)]
Horizontal Reach	19 ft (5.9 m)
Boom Rotation	700°
Rotation Speed	318° per minute, nominal
Basket Dimensions	51 in. W x 30 in. D x 45 in. H (129.5 cm x 76 cm x 114.3 cm)
Power Source, Gas Model	8 Horsepower, 4-Cycle, Gasoline Engine with Remote Start Control and Alternator Circuit
Storage Battery, Gas Model	12 Volt DC, 195 Amp Storage Battery, NAPA P/N 5022NF
Power Source, DC Model	24 Volt DC, 4 Deep Cycle, 245 Amp-hour Batteries
Battery Charger, DC Model	110/120 Volt, 40 Amp
Hydraulic Pressure	2756 psi (19,000 kPa)
Reservoir Capacity	2.75 Gallons (10.4 Liters)
Hydraulic Capacity	7 Gallons (26.5 Liters)
Hydraulic Oil	Energol HLP-HD46 (BP Oil)
Gross Vehicle Weight, DC Model	2860 lbs (1297 kg)
Gross Vehicle Weight, Gas Model	3200 lbs (1452 kg)
Tongue Weight, DC Model	100 lbs (45.4 kg)
Tongue Weight, Gas Model	160 lbs (72.6 kg)
Trailer Brakes	Mechanical Surge

2-3 WARRANTY

Bil-Jax warrants its boom lifts for one year from the date of delivery against all defects of material and workmanship, provided the unit is operated and maintained in compliance with Bil-Jax's operating and maintenance instructions. Bil-Jax will, at its option, repair or replace any unit or component part which fails to function properly in normal use.

This warranty does not apply if the lift and/or its component parts have been altered, changed, or repaired without the consent of bil-jax or by anyone other than Bil-Jax or its factory trained personnel, nor if the lift and/or its components have been subjected to misuse, negligence, accident or any conditions deemed other than those considered as occurring during normal use.

Components not manufactured by Bil-Jax are covered by their respective manufacturer's warranties. A list of those components and their warranties is available upon written request to Bil-Jax.

Bil-Jax shall not in any event be liable for the cost of any special, indirect, or consequential damages to anyone, product, or thing. This warranty is in lieu of all other warranties expressed or implied. We neither assume nor authorize any representative, or other person, to assume for us any other liability in connection with the sale, rental, or use of this product.

3
Operation

3-1 OPERATOR CONTROLS

The XLB-4319 Hydraulic Boom Lift is equipped with multiple operator controls. Equipment power and outrigger controls are located at ground level. Boom lift and rotation controls are located at ground level and in the basket.

Ground Control Station

The ground control station (Figure 3-1) operates the outriggers and lift booms. To access the boom controls, reach into the cover latch port and release the cover latch according to the latch decal. Open the control compartment cover. Unhook the support rod behind the front edge of the cover and place the rod end into the mating hole in the battery bracket.

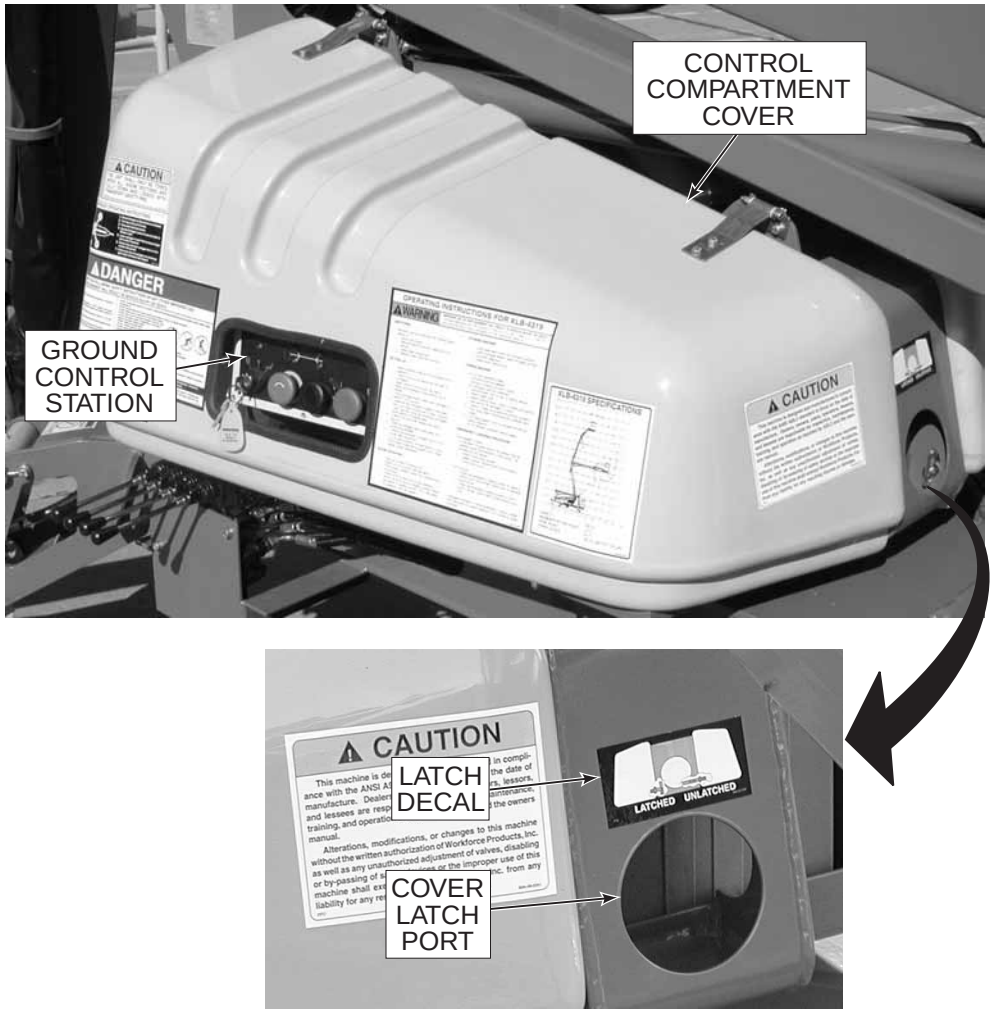


Figure 3-1. Ground Control Station Access

The ground control station (Figure 3-2) includes the following electrical and hydraulic controls.

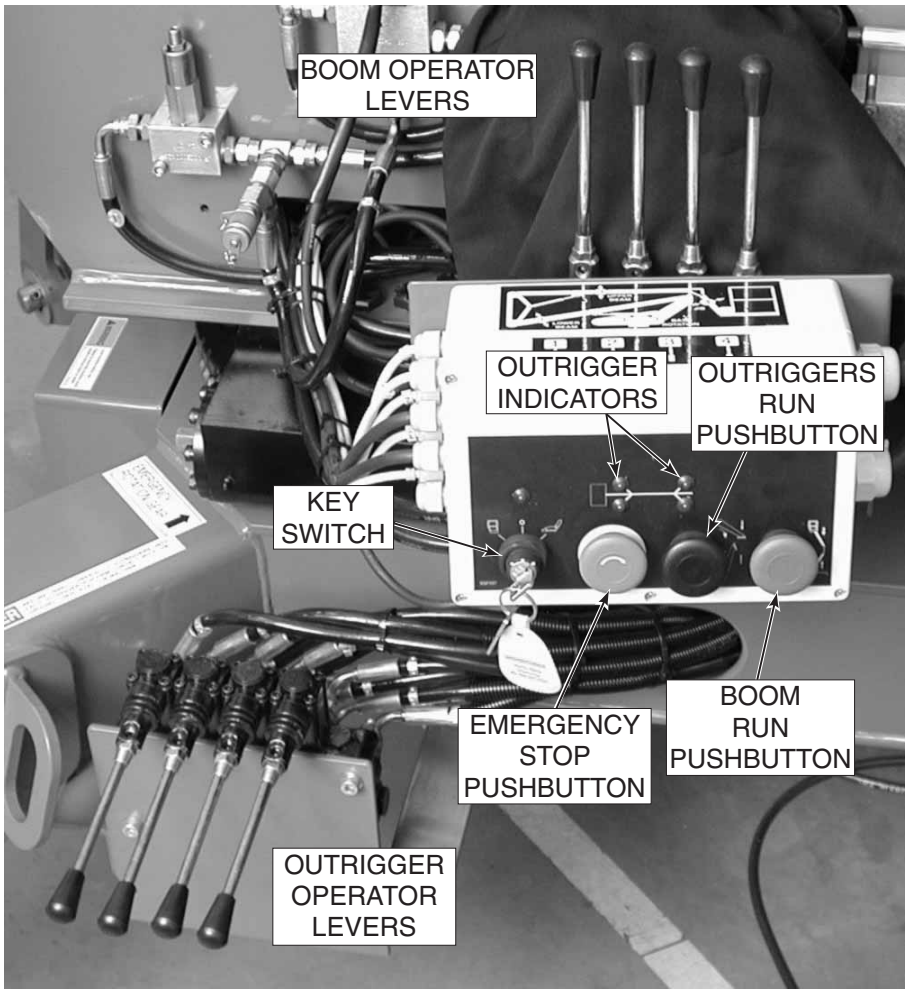


Figure 3-2. Ground Control Station

Key Switch

Turning the key switch to the left selects operation from the basket control station. Turning the key switch to the right selects operation from the ground control station. The center (Off) position disables electrical and hydraulic operations. Removing the key protects against unauthorized boom lift operation.

EMERGENCY STOP Pushbutton

When pressed, the EMERGENCY STOP pushbutton disconnects electrical power from the upper and lower control stations. Pressing the EMERGENCY STOP pushbutton also shuts off the gasoline engine or DC motor to interrupt hydraulic power. Before you can restore power, you must rotate the EMERGENCY STOP pushbutton clockwise.

Outrigger Indicators

Four green OUTRIGGER indicators light up when the boom lift outriggers are extended and the boom weight is removed from the trailer axle. All four indicators must be lit and the trailer must be level to enable operation of the lift booms.

Outriggers Run Pushbutton

Holding the black outriggers run pushbutton in enables operation of the outrigger cylinders. The outrigger cylinders can only be operated when the lift boom cylinders are retracted.

Boom Run Pushbutton

Holding the green boom run pushbutton in enables operation of the lift boom cylinders. The lift boom cylinders can only be operated when the outrigger cylinders are extended, the boom weight is removed from the trailer axle, and the trailer is level.

Outrigger Operator Levers

Four outrigger operator levers position the hydraulic valves to extend and retract the outrigger cylinders. Lifting an operator lever retracts the cylinder to raise the outrigger. Pushing down on an operator lever lowers the related outrigger. When released, the operator levers return to the center (valve-off) position. Starting on your left, the outriggers are numbered 1 through 4. A decal located below the outrigger valve manifold indicates which operator lever controls which outrigger.

Boom Operator Levers

Four boom operator levers position proportional hydraulic valves to extend and retract the boom lift cylinders and the boom rotation drive motor. Pulling a boom operator lever extends the cylinder to raise the boom. Pushing a boom operator lever lowers the related boom. How far the lever is pushed or pulled controls the boom lift speed.

Pulling the boom rotation operator lever turns the boom clockwise. Pushing the operator lever turns the boom counterclockwise. How far the lever is pushed or pulled controls the boom rotation speed.

When released, the boom operator levers return to the center (valve-off) position. A decal located in front of the valve manifold shows which boom motion is controlled by each operator lever.

Engine Keyswitch (Gas Model only)

On the gas model boom lift, the engine keyswitch (Figure 3-3) is used to start and stop the gasoline engine from the ground position. The keyswitch must be in the ON position (as shown) to enable engine start-up from the work basket control station.

Figure 3-3. Engine Keyswitch

Basket Control Station

The basket control station (Figure 3-3) operates the hydraulic boom lift, boom rotation. and basket rotation motions. The basket control station includes the following electrical and hydraulic controls.

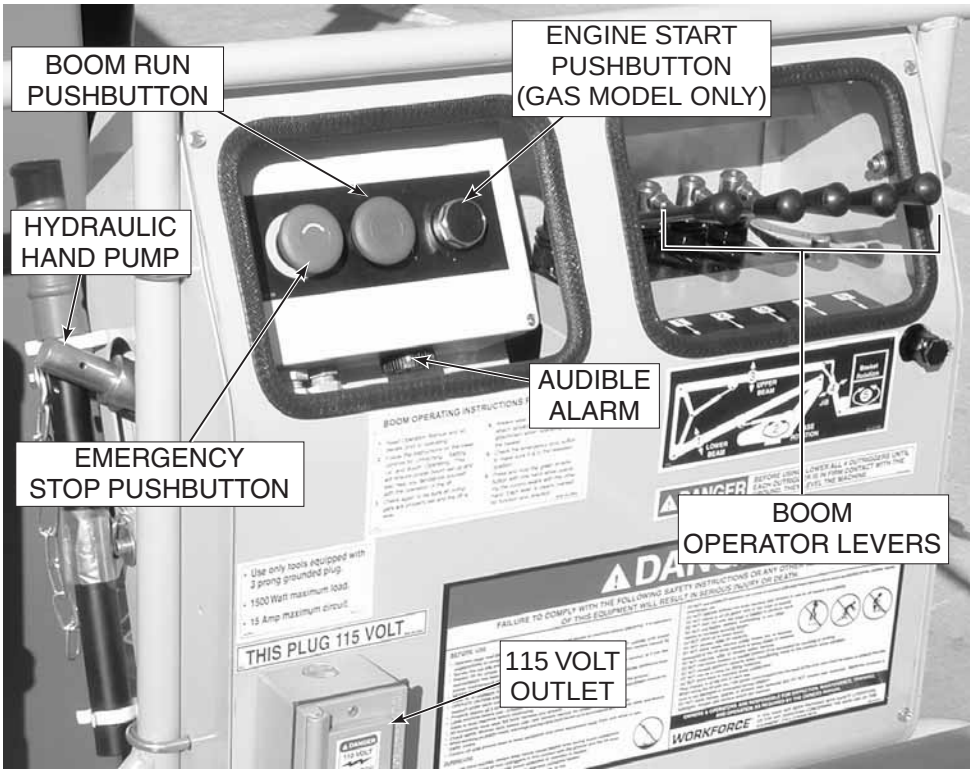


Figure 3-4. Basket Control Station

EMERGENCY STOP Pushbutton

When pressed, the EMERGENCY STOP pushbutton disconnects electrical power from the upper and lower control stations. Pressing the EMERGENCY STOP pushbutton also shuts off the gasoline engine or DC motor to interrupt hydraulic power. Before you can restore power, you must rotate the EMERGENCY STOP pushbutton clockwise.

Boom Run Pushbutton

Holding the green boom run pushbutton in enables operation of the boom lift and rotation functions. Boom lift and rotation can only be operated when the outrigger cylinders are extended, the boom weight is supported by all four outriggers, and the trailer is level.

Boom Operator Levers

Five boom operator levers position proportional hydraulic valves to extend and retract three boom lift cylinders, the boom rotation drive motor, and the basket swivel cylinder. Pulling a boom operator lever extends the cylinder to raise the boom. Pushing a boom lift operator lever lowers the related boom. How far the lever is pushed or pulled controls the boom lift speed.

Pulling the boom rotation or basket rotation operator lever turns the boom or basket clockwise. Pushing the operator lever turns the boom or basket counterclockwise. How far the lever is pushed or pulled controls the rotation speed.

When released, the boom operator levers return to the center (valve-off) position. A decal located in front of the valve manifold shows which boom motion is controlled by each operator lever.

Hydraulic Hand Pump

The basket control station is equipped with a hydraulic hand pump. In case lift boom operating power is lost, the hand pump is available to manually lower the lift boom. Holding the related operator lever in position and smoothly operating the hand pump lowers the lift boom or swivels the work basket to another position.

Engine Start Pushbutton (Gas Model only)

Pressing the engine start pushbutton restarts the gasoline engine while in the work basket. The pushbutton should only be pressed until the engine starts. The engine should not be cranked longer than 15 seconds at a time. Over-cranking will burn up the starter motor.

Audible Alarm

An audible alarm is located in the basket station control panel. The audible alarm sounds whenever the key switch is on and the boom lift is out of level.

115 Volt Outlet

The 115 Volt AC outlet is provided for running electrical power tools in the work basket. A connecting power cord must be plugged in to a suitable power source. The power plug is located on the inside of the trailer frame, near the tow end of the trailer. The outlet is rated for a 15-ampere load. Do not overload the accessory power circuit.

3-2 NORMAL OPERATING PROCEDURE

Perform the following procedures to operate the XLB-4319 Hydraulic Boom Lift.

1. Read and follow all safety precautions contained in Section 1 and all responsibilities outlined in the ANSI A92.2 reprint contained in Section 7 of this manual.
2. Position the lift at the work area. Make sure the lift is on a firm and level surface and that there are no potential hazards such as overhead obstructions or electrically charged conductors. Do not operate the lift if such hazards exist.
3. Check the tow trailer and boom lift for damaged or worn parts. Repair or replace parts as necessary. Do not use a damaged boom lift.
4. Apply the trailer parking brake.
5. Lower the trailer tongue jack and unhitch the trailer from the tow vehicle. The trailer must be unhitched before the outriggers are lowered.
6. See Figure 3-4 and lower the boom lift outriggers as follows:
   a. Start the engine or motor.
   b. Turn the key switch to the ground control position.
   c. Press and hold in the black outrigger run pushbutton.

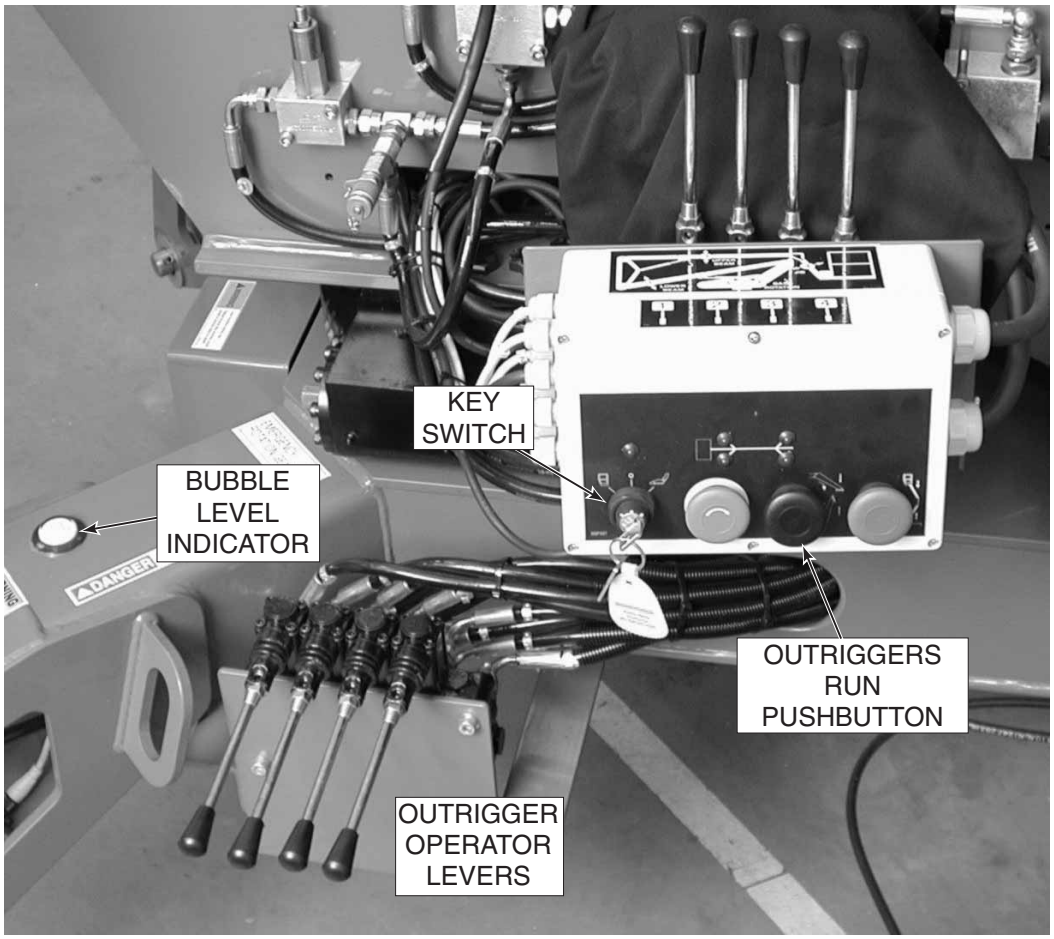


Figure 3-5. Outrigger Controls

⚠ WARNING

Always verify that the green outrigger LEDs light up when the outrigger feet become loaded. If an outrigger LED fails to light up or lights up before the outrigger foot becomes loaded, the limit switch or switch setting is faulty. Using the boom lift with a faulty limit switch or switch setting can cause severe injury, death, or damage to the equipment.

d. Push down on the rear outrigger levers (1 & 2) to lower the rear outriggers. Lower the rear outriggers only until the rear outrigger LEDs light up on the control panel.

e. Push down on the front outrigger levers (3 & 4) to lower the front outriggers. Raise the trailer wheels off the ground. Verify that the front outrigger LEDs light up on the control panel.

f. Watch the bubble level indicator and adjust the outriggers as needed to level the trailer.

NOTE: An LED level switch and four outrigger position switches prevent boom motions if the trailer is not level or if one or more outriggers is not supporting the vehicle load. The load of the boom lift vehicle must be placed on all four outriggers and the trailer must be level to enable motor-powered boom lift operations.

7. Remove the keeper pins and transport pins that secure the upper and lower booms. Stow the transport pins in the retainer clips provided.

8. Use the ground control station to operate the boom lift controls. Raise, lower, and rotate the boom to get familiar with the controls. Learn to smoothly start and stop all boom motions.

9. Lower the boom sections to position the basket for boarding. Turn the key switch to the basket control position.

10. Raise the safety bar and enter the basket. Put on the safety harness and attach the lanyard to the attachment position on the basket railing. Operate the boom lift carefully.

11. When boom lift operations are complete, retract the boom and outriggers for trailer towing according to the following procedure:

    a. Using the basket control station, rotate the basket to the center position.

    b. Fully retract the jib boom, the upper boom, and the lower boom.

    c. Exit the basket and turn the key switch to the ground control position.

    d. Retract the two rear outriggers until the trailer tires touch. Do not fully retract the rear outriggers.

    e. Retract the front outriggers until fully raised.

    f. Retract the rear outriggers until fully raised.

    g. Prior to towing, install the transport pins and keeper pins to secure the upper and lower booms. Refer to paragraph 3-6 for towing instructions.

3-3 EMERGENCY LOWERING

The XLB-4319 Boom Lift is equipped with two manual lowering valves and a hydraulic hand pump. These devices can be used to lower the basket in case of a power failure, a load shift, or other emergency situation.

The manual lowering valves are located on the upper and lower boom lift cylinders and are manually operated from the ground. The hydraulic hand pump is located in the work basket. Use the hand pump in case an assistant is not available on the ground.

To lower the work basket from the ground, push in the valve plunger (Figure 3-6) on the lower boom lift cylinder. Continue pushing the valve plunger to fully retract the lower boom. Push in and hold the valve plunger on the upper boom lift cylinder until the upper boom is retracted.

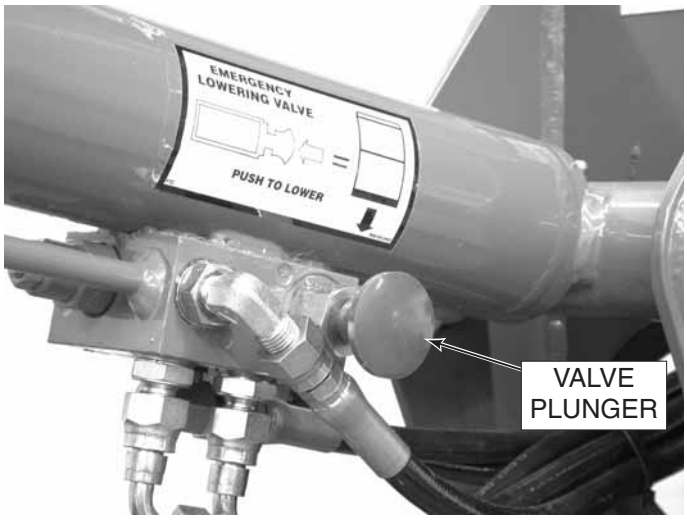


Figure 3-6. Manual Lowering Valve

To manually lower the boom lift from the work basket, push the upper or lower boom operator lever (Figure 3-7) down and use the hand pump to lower the boom. Apply a steady up-and-down pumping action. The hydraulic cylinders are dual acting; boom motion will continue throughout pump handle operation.

Figure 3-7. Basket Control Station

3-4 MANUAL BOOM ROTATION

The hydraulic boom lift is equipped with an emergency rotation handle (crank) that can be used to rotate the boom in case of a power failure or other emergency situation.

Use the following procedure to manually rotate the boom:

1. Remove the crank from its stowage rack and install the crank on the hex end of the worm gear drive screw (Figure 3-8).
2. Hold the boom rotation valve lever in the correct position for boom rotation and turn the crank to rotate the boom.

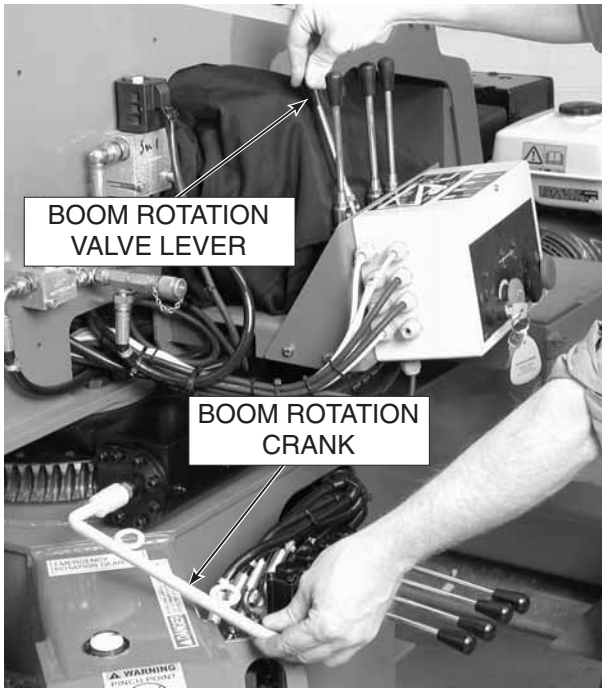


Figure 3-8. Emergency Rotation

3-5 BATTERY RECHARGE (DC MODEL ONLY)

The DC model boom lift batteries should be recharged after each 8-hour work shift or more often if needed. When the boom lift is not in use, the batteries should be recharged at least once per week.

The normal charge time is 10 to 12 hours. If the battery charge is extremely low, a full recharge may take up to 24 hours.

Recharge the DC model boom lift batteries as follows:

⚠ WARNING

Recharge the batteries in a well ventilated area only. Do not charge batteries near fire, flame, or other ignition sources. Batteries being charged may emit highly explosive hydrogen gas. Failure to properly ventilate the charge gases may result in serious injury or death.

1. Move the boom lift to a well ventilated area with direct access to a grounded 120 VAC electrical outlet. Make sure the recharge area is not near fire, flames or other ignition sources.
2. Plug a short, heavy-duty power cord into the battery charger receptacle on the electrical cord connected to the charger. The recommended power cord should be an 12 AWG multi-strand, grounded cord no longer than 50 feet (16 meters).

NOTE: Using an underrated or long power cord will reduce the output of the battery charger, resulting in longer charge time.

3. Plug the power cord into a grounded 120 VAC receptacle. Verify that the red ON-CHARGING indicator LED lights up on the battery charger.
4. To determine the charge rate at any time during the charge cycle, observe the DC ammeter (Figure 3-9). The ammeter needle moves to the right at the start of the charge cycle. As the battery charge rises, the needle moves farther left.

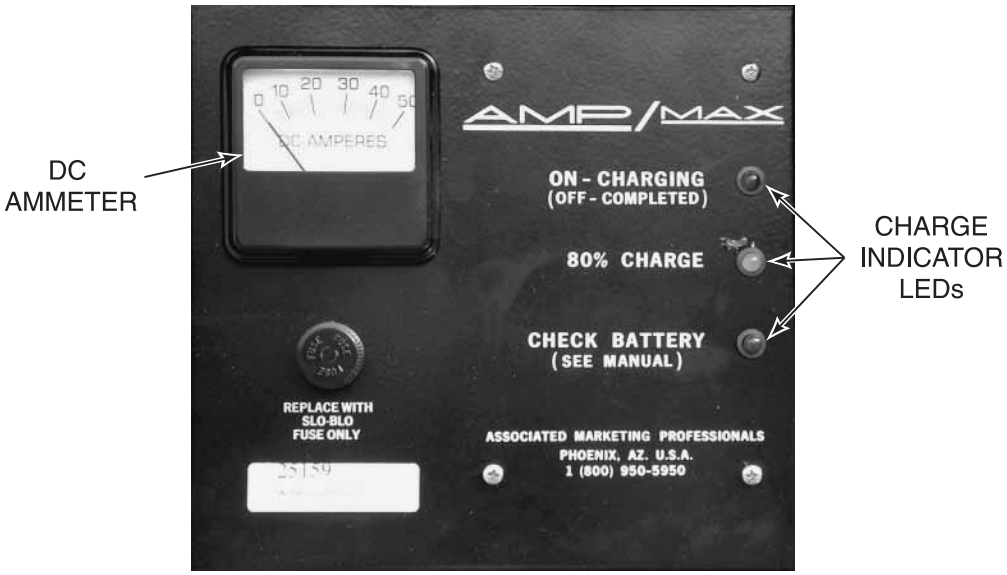


Figure 3-9. Battery Charger

⚠ CAUTION

Always remember to unplug the battery charger power cord before moving the boom lift. Failure to unplug the power cord will cause damage to the equipment.

5. Inspect the charge indicator LEDs near the end of the expected charge cycle. If all indicator LEDs are off, the battery is fully charged. (The DC ammeter needle should point to the left.)

NOTE: **The yellow 80% CHARGE indicator lights up when the battery voltage is nearing full charge. At full charge (3-1/2 hours after the 80% CHARGE indicator lights up), the charger turns off.**

If the battery voltage does not reach the 80% CHARGE level in 14 hours, the charger turns off and the red CHECK BATTERY indicator LED lights up. This prevents extended charging of a faulty battery.

6. Unplug the power cord from the 120 VAC receptacle and the charger receptacle. Properly store the power cord for next use.

3-6 BOOM LIFT TRANSPORT

The boom lift trailer is a single axle trailer fitted with a two-inch ball hitch, surge brakes, breakaway safety cable, safety chains, brake lights, and side marker lights. Proper boom lift transport requires the correct hookup and inspection of these trailer components before towing. Use the following procedures to hitch, tow, and back the boom lift trailer:

Trailer Hitching

Trailer hitching requires a second person to give tow vehicle backing instructions.

1. Back the tow vehicle to the trailer. Verify that the ball and hitch are in line and that the trailer hitch will clear the ball. Jack up the tongue as needed.
2. Align the ball and hitch (Figure 3-10). Fasten the breakaway safety cable to the tow vehicle.

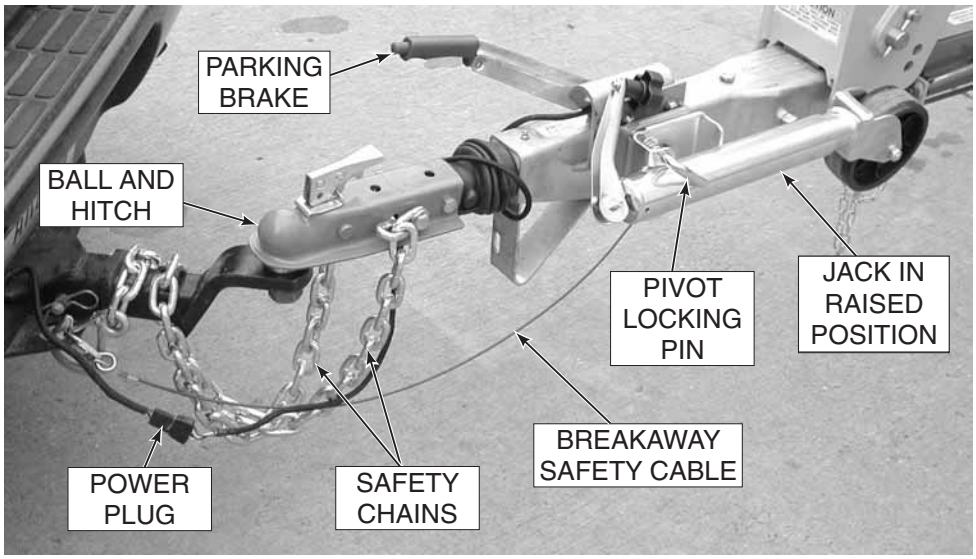


Figure 3-10. Trailer Hitching

3. Hold ball hitch release lever open and lower the hitch onto the ball. Let go of the release lever to secure the ball.
4. Crank the jack down to check for secure coupling. If jacking will raise the tow vehicle bumper two or three inches, the ball hitch coupling is secure.
5. Release the trailer parking brake.
6. Pull the pivot locking pin. Swivel the jack 90 degrees to the travel position and release the pivot locking pin.

⚠ CAUTION

Always cross and attach the safety chains before towing. Failure to attach safety chains properly will allow tongue to drop in case of ball hitch failure, resulting in serious damage to the trailer and equipment.

7. Attach the trailer safety chains to the tow vehicle. Make sure the chains cross under the trailer tongue. If needed, cross the chains over then under the tow bar to prevent dragging.
8. Connect the trailer lights to the tow vehicle power plug.
9. Check the breakaway safety cable. If the safety cable does not have adequate slack, the brakes may drag.
10. Before towing the trailer, check the following and make all necessary adjustments, corrections, or repairs:
    a. Check that the trailer jack and outriggers are in their travel positions.
    b. Verify that the transport pins and pin keepers secure the upper and lower booms. If the booms are not secured, install the transport pins and pin keepers at this time.
    c. Verify that the basket is centered and that all onboard equipment is secured.
    d. Check that the key switch is in the OFF position. Remove the key.
    e. Verify that trailer brake lights and marker lights work properly.
    f. Check that the trailer tires are evenly inflated and not low on air.

⚠ WARNING

Improper tightening of boom lift trailer wheel nuts can cause wheel lugs to shear, causing serious injury or damage to equipment. Check and maintain the proper wheel nut torque according to the maintenance instructions in this manual.

Periodically check the wheel nut torque according to the instructions in Section 4 of this manual. More frequent torque checks are required when a wheel is recently installed.

Prior to towing, while the trailer wheels are elevated for boom lift operation, check for loose wheels and for wheel lug wear indications. If a loose wheel mounting is indicated, remove and inspect the wheel lugs for damage. Do not tow the boom lift with worn or damaged wheel lugs.

4
Maintenance

4-1 SCHEDULED SERVICE CHECKS

Daily/Weekly Service Checks

Perform the following daily/weekly service checks as listed in Table 4-1.

Table 4-1. Daily/Weekly Service Checks

Service Check	Daily before use	Weekly
Check to see that all decals are present.	✓	
Check that controls and indicators at ground and basket control stations operate properly.	✓	
Raise booms and press emergency stop pushbutton. Verify that booms remain elevated and do not drift down.	✓	
Check that boom down limit switch and outrigger position switches operate properly.	✓	
Check/add hydraulic oil.	✓	
Check/add engine oil.	✓	
Check engine air filter element. Clean or replace dirty or damaged air filter element.	✓	
Check trailer tires for proper inflation. When cold, tires should be inflated to 55 psi (3.8 bar).	✓	
Check trailer running lights for proper operation.	✓	
Check battery electrolyte level. If battery charge is low, add water to bring electrolyte just above plates. If batteries are fully charged, raise electrolyte to full mark in each cell.		✓
Check trailer hitch components for damage and proper operation. Refer to Trailer Hitching in paragraph 3-6.		✓
Check electrical wiring for cuts, loose terminals, broken wires, chaffing, corrosion, or other damage. Repair all damage, remove corrosion, and seal exposed connections.		✓
Lubricate grease fittings labeled LUBRICATE WEEKLY with NLGI Grade 2 multi-purpose grease.		✓
Check trailer and boom lift for missing or loose hardware. Replace or tighten missing or loose hardware as needed.		✓

Monthly Service Checks

Perform the following monthly service checks as listed in Table 4-2.

Table 4-2. Monthly Service Checks

Service Check	Every month	Every 6 months	Every 12 months
Check/add hydraulic oil per paragraph 4-4.	✓		
Clean battery terminals and battery charger operation.	✓		
Check operation of manual lowering valves and hand pump.	✓		
Check wheel nut torque per paragraph 4-2.	✓		
Lubricate compartment hinges and latches with light weight machine oil.	✓		
Lubricate grease fittings labeled LUBRICATE MONTHLY per paragraph 4-3.2.	✓		
Lubricate trailer tongue jack (2 places) with NLGI Grade 2 multi-purpose grease.	✓		
Lubricate grease fittings labeled LUBRICATE SEMI-ANNUALLY per paragraph 4-3. 3.		✓	
Change engine oil.		✓	
Check battery cables and wiring for loose connections and damaged wires.		✓	
Replace spark plug.			✓
Replace hydraulic oil and oil filter.			✓
Check boom pivot pin and sleeve bearings for wear. Replace worn or damaged pivot pins and sleeve bearings.			✓
Check slew bearing for wear or damage per paragraph 4-5.			✓
Inspect and adjust trailer brakes.			✓
Load test boom lift operations with 450 pounds (204 kg).			✓

4-2 WHEEL NUT TORQUE REQUIREMENTS

It is very important to apply and maintain the correct wheel bolt torque on the boom lift trailer. The wheel bolts must be evenly tightened to the following specified torque increments whenever a trailer wheel is removed and installed. Use the following tightening procedure:

1. Evenly tighten the wheel bolts to 25 lb-ft (34 N·m) in the tightening sequence shown in Figure 4-1.

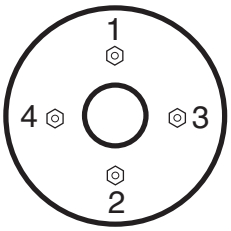


Figure 4-1. Wheel Bolt Tightening Sequence

2. Evenly tighten the wheel bolts to 60 lb-ft (81,4 N·m) using the tightening sequence shown.
3. Evenly tighten the wheel bolts to 100 lb-ft (135,6 N·m) using the tightening sequence shown.

4-3 LUBRICATION

Lubrication makes operation of the XLB-4319 Boom Lift more efficient and extends the equipment life. Use the following procedures to lubricate the boom lift components.

1. Lubricate trailer jack post and all grease fittings labeled LUBRICATE WEEKLY with NLGI Grade 2 multi-purpose grease.
2. Lubricate all LUBRICATE MONTHLY grease fittings with NLGI Grade 2 multi-purpose grease. Wipe off dirt and grease residue. Add approximately ½ ounce (15 cc) of grease to each fitting. See Figure 4-2 for grease fitting locations.

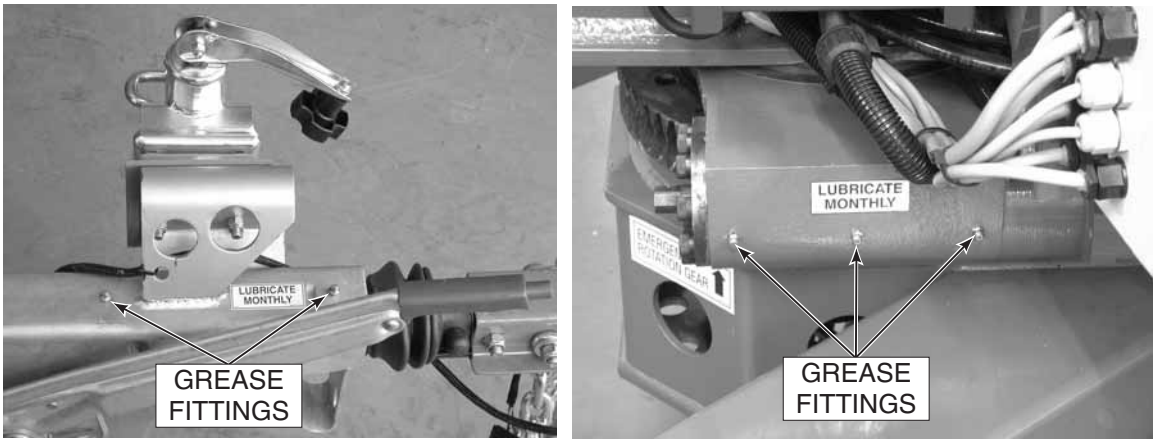


Figure 4-2. Lubricate Monthly

3. Lubricate the slew ring bearing grease fitting (Figure 4-3) with NLGI Grade 2 multi-purpose grease. Wipe off dirt and grease residue. Rotate the boom and add approximately ½ ounce (15 cc) of grease to each bearing quadrant.

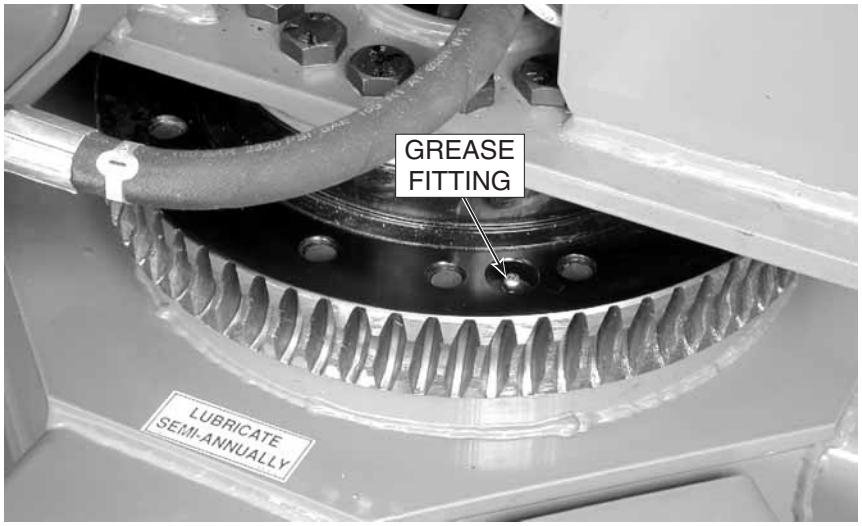


Figure 4-3. Lubricate Semi-Annually

4-4 HYDRAULIC SYSTEM

Hydraulic system maintenance varies with equipment use and the environment in which the boom lift is used. Constant attention to keep the oil clean and the reservoir properly filled will help prevent possible damage to the system. Hydraulic diagrams are provided in this section for general reference.

⚠ WARNING

Hydraulic system pressure settings are factory settings and should not need readjustment. The only time readjustment is needed is when a component in the hydraulic control circuit is replaced. Only the adjustments covered in this manual are permitted. If you believe that any other hydraulic component needs adjustment, notify Bil-Jax for additional instruction. Hydraulic motions are quiet, quick, and can be dangerous to persons on or near the lift vehicle. Failure to heed this warning can result in serious injury or death.

Hydraulic System Inspection

Check the hydraulic hose and fittings for leaks and damage daily. Tighten or replace as necessary to prevent hydraulic oil loss. Secure hoses and lines as needed to prevent rubbing and chafing.

Fluid Check and Replacement

The oil level should be checked with the engine or motor off, the boom down, and the trailer on a level surface. Pull the dipstick out of the reservoir (Figure 4-4) and wipe off any oil with a clean shop cloth, then reinsert the dipstick. Pull the dipstick to check the oil level. The oil level should be between the full and add oil marks on the dipstick.

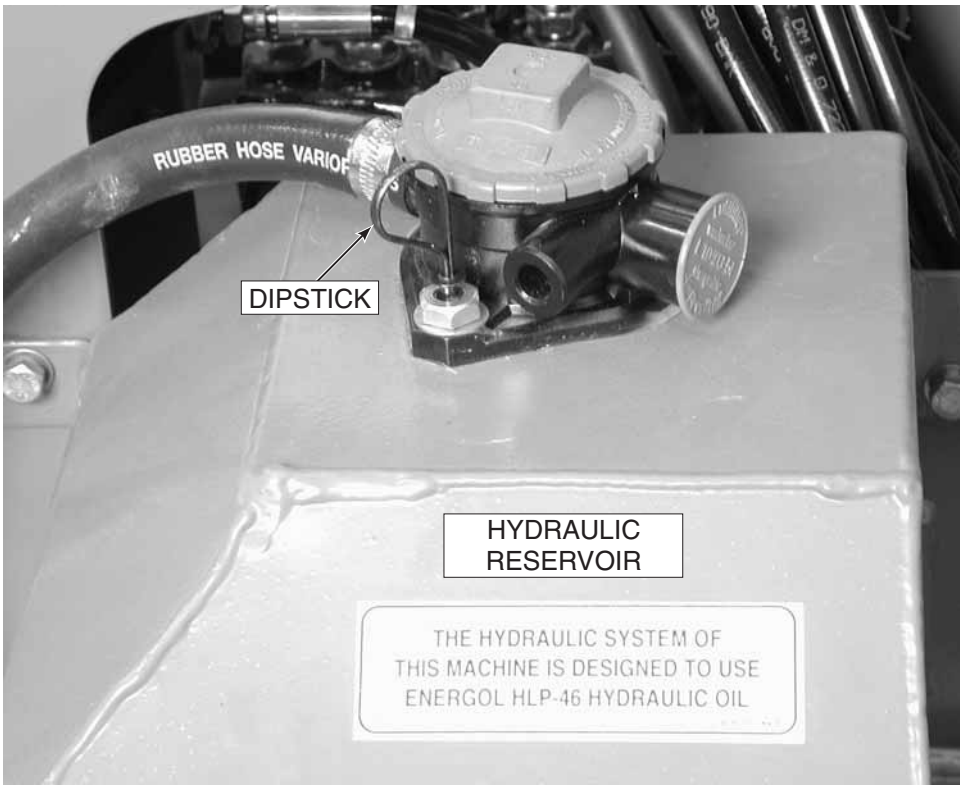


Figure 4-4. Hydraulic Reservoir

Do not mix hydraulic oils. The reservoir is originally filled with Energol HLP-HD46, a high-grade, non-foaming hydraulic oil designed for temperatures as low as -20°F (-33°C). For temperatures reaching -40°F (-40°C), use Dextron Automatic Transmission Fluid Type A.

If either oil is not available, a good grade SAE 10W hydraulic oil may be used where the low temperature is above 32°F (0°C). SAE 5W hydraulic oil may be used where low temperatures reach 0°F (-18°C).

Once a year or whenever the oil becomes contaminated, drain the reservoir, clean the sump strainer, and replace the hydraulic oil and return filter.

Return Filter Replacement

The hydraulic oil filter should be replaced yearly or whenever filter contamination has a noticeable effect on the beam lift functions. If return filter clogging is suspected, check the system hydraulic pressure.

With engine or motor running and no controls actuated, hydraulic system pressure should be near 0 (zero), or minimal. If the pressure exceeds 30 psig (2 bar) (200 kPa gage), the return filter should be replaced as follows:

1. Use cleaning cloths and alcohol solvent to clean away dirt on filter cover and housing (Figure 4-4). Be sure to place reusable components on new cleaning cloths. **Do not allow filter parts to become contaminated.**
2. Use a wrench to loosen filter cover.
3. Remove filter cover. Place reusable filter parts on new cleaning cloths.
4. Lift filter element and element holder above reservoir oil level. Drain residual oil back into filter housing.
5. Remove and discard used filter element.
6. Locate OUT marking on one end of new filter element.
7. With OUT end up, seat new filter element in center of filter holder.
8. Seat filter holder and element in filter housing.
9. Wipe o-ring and mating seal surface of cover with cleaning cloth. If o-ring is cut or gouged, replace o-ring.
10. Install and hand tighten filter cover. Do not over-tighten filter cover.

Air Bleeding

Delayed response or sporadic boom lift motions may indicate air in the lift cylinders. Use the following procedure to bleed entrapped air from the hydraulic system.

1. Fill the reservoir with the proper hydraulic fluid. Replace, but do not tighten the reservoir fill cap.
2. Fully raise and lower the boom to return oil with entrapped air to the reservoir.
3. Allow several minutes for air to escape the reservoir oil.
4. Repeat steps 1 through 3 as needed. Add oil slowly and only when the boom is lowered to prevent adding more air to the system.

Hydraulic Pressure Checks and Adjustments

Hydraulic pressures are set at the factory and should not be adjusted unless a hydraulic component has been replaced in the regulated circuit.

On the gas engine model a pressure test port (Figure 4-5) is located at the ground station boom control valves. A hydraulic pressure gage [0-6000 psig (0-400 bar) (41 000 kPa gage) minimum range] must be connected to the test port when adjusting hydraulic pressures. This is the only pressure test port on the boom lift.

On the DC model boom lift, the main bypass valve and pressure test port are mounted on the hydraulic manifold located between the hydraulic pump and reservoir. To prevent tampering, the main bypass valve cap is secured with locking wire and a seal. If a pressure adjustment is required, call Bil-Jax and request a replacement lock wire and seal.

The boom lift has four bypass valves that regulate hydraulic operating pressures. These include (1) the main bypass valve, (2) the outriggers bypass valve, (3) the basket station boom controls bypass valve, and (4) the ground station boom controls bypass valve.

Check/Adjust System and Outriggers Hydraulic Pressures

The system hydraulic pressure (pump output pressure) is regulated by the main bypass valve. The system hydraulic pressure is used to power all hydraulic operations. The main bypass valve and pressure test port for the gas model boom lift are shown in (Figure 4-5).

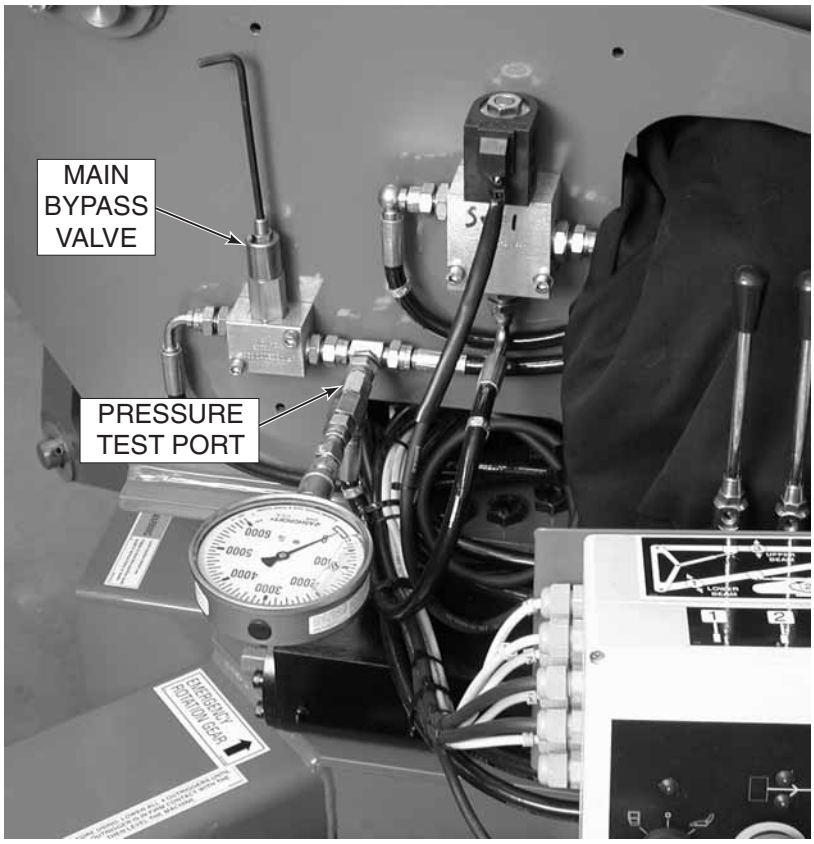


Figure 4-5. Main Bypass Valve and Pressure Test Port (Gas Engine Model)

To adjust the system hydraulic pressure, we must first set the outriggers bypass pressure very high. This ensures that you are reading system pressure when fully retracting an outrigger cylinder. After adjusting the system pressure, we must readjust the outriggers bypass pressure to specification.

Adjust System Pressure

1. Connect a hydraulic pressure gage to the pressure test port.
2. Remove the cap from the outriggers bypass valve (Figure 4-6). Turn the adjust screw to the right exactly two turns. This adjustment will allow the main bypass valve to regulate the test pressure.
3. Reinstall and tighten the cap to prevent oil leakage. Do not over tighten the cap.

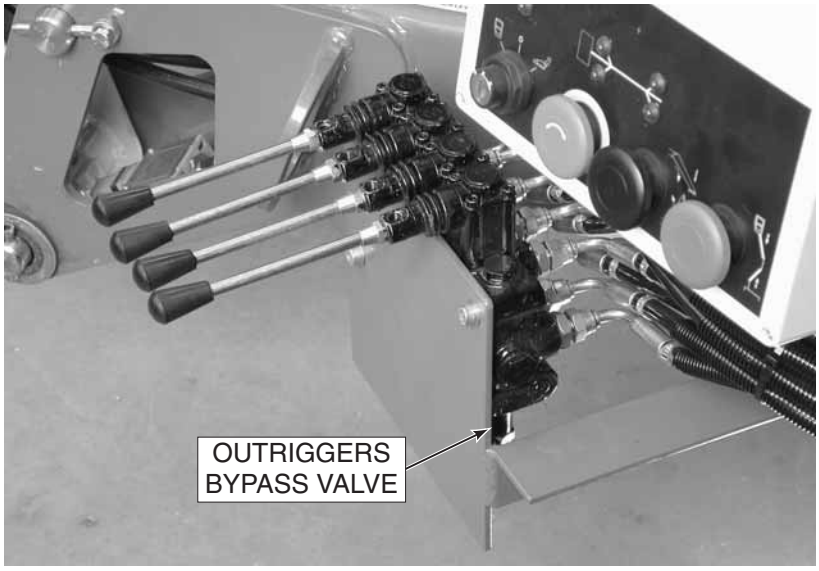


Figure 4-6. Outriggers Bypass Valve

4. Start the gasoline engine or DC motor. Run the engine or motor for at least five minutes to warm the hydraulic oil to the normal operating temperature.
5. Pull up one outrigger control lever to fully retract the outrigger. While the outrigger control lever is pulled up, read the pressure gage. If the pressure is rising, allow the pressure to reach its highest reading.
6. On the gas model boom lift, if the pressure gage reading is 3045 psig [210 bar (21 000 kPa)] nominal, no adjustment is required. If an adjustment is required, proceed with step 8.
7. On the DC model boom lift, if the pressure gage reading is 2750 psig [190 bar (19 000 kPa)] nominal, no adjustment is required. If an adjustment is required, proceed with step 8.

NOTE: Loosening the adjust lock nut will cause hydraulic oil to leak from the main bypass valve. It is recommended that you shut the engine off before making adjustments to the main bypass valve.

8. Press the emergency stop pushbutton to turn off the hydraulic pump.
9. Loosen the adjust lock nut for the main bypass valve.

10. Use hex wrench to turn the pressure adjust screw. Turn the adjust screw right for higher pressure or left for lower pressure. Turning the adjust screw 1/4 turn will adjust the pressure about 150 psig [10,4 bar (1 037 kPa gage)].
11. Tighten the adjust lock nut.
12. Reset the emergency stop pushbutton and restart the engine or motor.
13. Pull up one outrigger control lever and recheck the system pressure. If the pressure is still too high or too low, repeat the adjustment starting with step 6.
14. When the system pressure is properly adjusted, remove the cap from the outriggers bypass valve (Figure 4-6). Turn the adjust screw to the left two turns.
15. Reinstall and tighten the adjust screw cap. Do not over tighten the cap.

Check/Adjust Outriggers Pressure

1. Pull up one outrigger control lever and read the pressure at the gage. If the gage reading is 2750 psig [190 bar (19 000 kPa)] nominal, no adjustment is required.
2. If the outriggers pressure is too high or too low, remove the cap (Figure 4-6) and adjust the pressure. Turning the adjust screw to the right 1/4 turn will raise the pressure about 150 psig [10,4 bar (1 037 kPa gage)].
3. Reinstall and tighten the adjust screw cap. Do not over tighten the cap.
4. Repeat steps 1 through 3 as needed to properly adjust outrigger pressure.
5. If no other hydraulic pressures are to be checked, shut down the engine or motor and remove the pressure gage.

Check/Adjust Boom Hydraulic Pressure

The hydraulic pressure for the basket station boom controls is regulated by a bypass valve (Figure 4-7) at the front of the basket station valve bank. The hydraulic pressure for the ground station boom controls is regulated by an identical valve at the back of the ground station boom controls. The regulated pressure is used to extend and retract all basket and boom positioning cylinders.

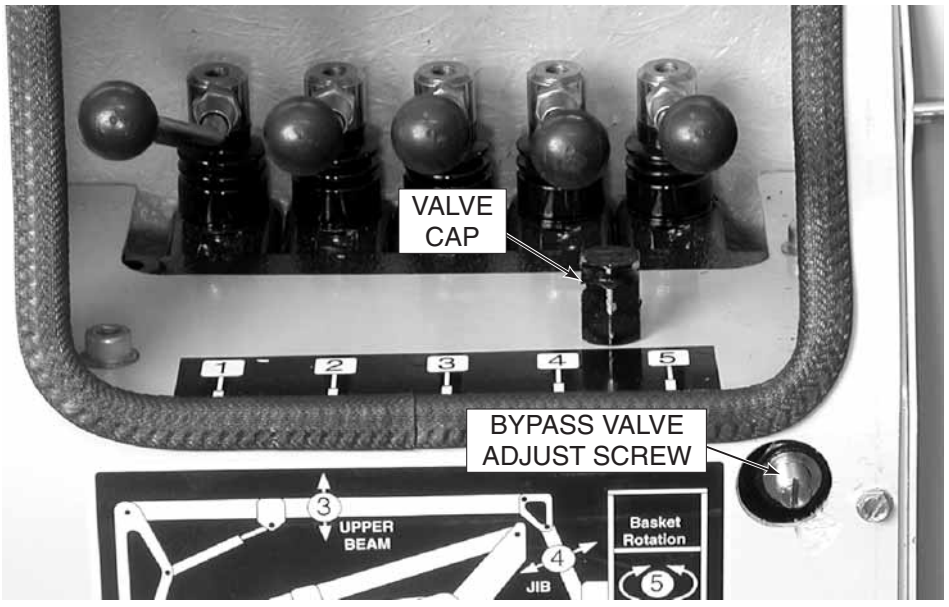


Figure 4-7. Boom Control Bypass Valve, Basket Station

Check and adjust the hydraulic bypass pressure for the basket or ground station boom controls as follows:

1. Connect a hydraulic pressure gage to the pressure test port.
2. Start the gasoline engine or DC motor. Run the engine or motor for at least five minutes to warm the hydraulic oil to the normal operating temperature.
3. Extend the outriggers to fully support and level the boom lift.
4. Turn the ground control station key switch to basket or ground position, according to which bypass pressure (basket or ground control) is to be adjusted.

NOTE: When adjusting the bypass pressure for the basket station boom controls, the basket station boom controls must be used. When adjusting the bypass pressure for the ground station boom controls, the ground station boom controls must be used.

5. Push down the lower beam control lever at the basket or ground station and read the pressure gage. If the pressure gage reading is 2750 psig [190 bar (19 000 kPa)] nominal, no adjustment is required. If an adjustment is required, proceed with step 6.
6. Press the emergency stop pushbutton to turn off the hydraulic pump.

NOTE: Removing the adjust screw cap while the hydraulic pump is running will cause oil to leak from the bypass valve. It is recommended that you shut the engine off before removing the adjust screw cap.

7. Locate the bypass valve for the selected boom control valve bank. Remove the adjust screw cap.
8. Use screwdriver to turn the adjust screw. Turning the adjust screw 1/4 turn to the right will increase the pressure about 150 psig [10,4 bar (1 037 kPa gage)].
9. Reinstall and tighten the adjust screw cap. Do not over tighten the cap.
10. Reset the emergency stop pushbutton and restart the engine or motor.
11. Push the upper or lower beam control lever down at the basket or ground station controls and read the pressure gage. If the bypass pressure is still too high or too low, repeat the adjustment starting with step 6.
12. If no other hydraulic pressures are to be checked, shut down the engine or motor and remove the pressure gage.

Hydraulic Cylinder Replacement

⚠ WARNING

Hydraulic cylinders are heavy and may have hydraulic oil on the surface. Hydraulic cylinders must be secured with lifting straps or tie-downs when removing, installing, and handling. Failure to heed this warning can result in serious injury.

Boom Lift Cylinder Removal and Installation

⚠ WARNING

Make sure the boom and boom cylinder are securely supported before removing the boom cylinder. Failure to do so may cause the boom or boom cylinder to fall. This may cause severe injury or damage to the boom lift.

1. If removing the lower boom lift cylinder, raise the lower boom to just above horizontal and stand a 36 inch (90 cm) long length of 4x4 hardwood shoring on the trailer tongue directly below the lower boom rest plate. Lower the boom onto the shoring. Manually check the stability of the shoring.
2. If removing the upper boom lift cylinder, raise the lower boom about two inches (50 mm) above the boom rest position.
3. Press in and hold the manual lowering valve at the boom lift cylinder that is to be replaced. Bleed off all hydraulic pressure to the cylinder.
4. Refer to Figure 4-8. At the piston rod end of the cylinder, unscrew and remove the keeper pins from both sides of the pivot pin. Thread the removed keeper pin hardware to the boom for use during cylinder installation.
5. Drive out the pivot pin with a hammer and a brass or hardwood drift. Do not allow the free end of the cylinder to fall.

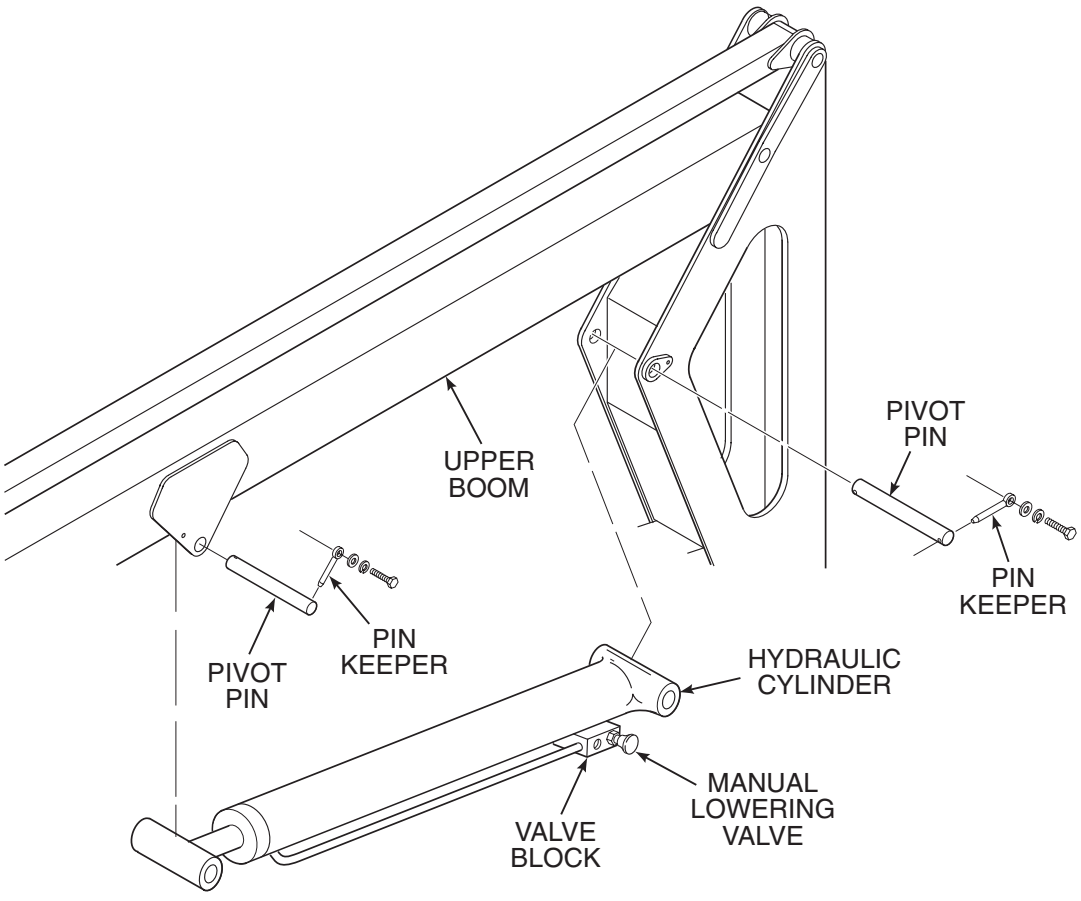


Figure 4-8. Hydraulic Cylinder Removal

6. If removing the lower boom lift cylinder, fully retract the cylinder. Use the pivot pin to turn the piston rod pivot boss 90°. Lower the cylinder through the relief slot in the stabilizer beam (not shown).
7. Turn off the key switch and remove the key.
8. Tag the hydraulic hoses that connect to the cylinder valve block. Each valve block port is stamped with an identity number.
9. Place absorbent drip cloths below the cylinder ports. Remove the hydraulic hoses from the lift cylinder. Elevate the hoses to help prevent fluid leakage. Protect exposed hose fittings and cylinder ports with plugs and caps.
10. At the base of the cylinder, unscrew and remove the keeper pins from both sides of the boom pivot pin. Thread the removed keeper pin hardware to the boom for use during cylinder installation.
11. Drive out the pivot pin with a hammer and a brass or hardwood drift.
12. Lift and remove the cylinder using an overhead hoist and lifting straps.
13. After repairing the hydraulic cylinder, reinstall the cylinder in the reverse order of removal.
14. Power up the hydraulic system and check for leakage. Tighten the hydraulic fittings as needed.
15. Bleed entrapped air from the hydraulic cylinder according to instructions in paragraph 4-4.

NOTE: Do not tamper with the cylinder counterbalance or manual lowering valves. If the valves need adjustment, contact the Bil-Jax Service Department at 800-537-0540.

Outrigger Cylinder Removal and Installation

1. Lower the outrigger until the foot pad meets the floor and supports only the outrigger beam. Leave the weight of the boom lift on the trailer wheels.
2. At the piston rod end of the cylinder, unscrew and remove the keeper pins from both sides of the boom pivot pin. Thread the removed keeper pin screws and keeper pins to the outrigger beam for use during cylinder installation.
3. Place a block of wood shoring between the outrigger beam and cylinder.

4. Drive out the pivot pin with a hammer and a brass or hardwood drift. Do not allow the free end of the cylinder to fall.
5. Fully retract the cylinder.
6. Turn off the key switch and remove the key.
7. Tag the hydraulic hoses that connect to the cylinder valve block. Each valve block port is stamped with an identity number.
8. Place absorbent drip cloths below the cylinder ports. Remove the hydraulic hoses from the lift cylinder. Plug the hose fittings to prevent fluid leakage. Protect exposed cylinder ports with plugs and caps.
9. At the base of the cylinder, unscrew and remove the keeper pins from both sides of the pivot pin. Thread the removed keeper pin screws and keeper pins to the mating beam for use during cylinder installation.
10. Drive out the pivot pin with a hammer and a brass or hardwood drift.
11. Lift and remove the cylinder using an overhead hoist and lifting straps.
12. After repairing the hydraulic cylinder, reinstall the cylinder in the reverse order of removal.
13. Power up the hydraulic system and check for leakage. Tighten the hydraulic fittings as needed.
14. Bleed entrapped air from the hydraulic cylinder according to instructions in paragraph 4-4.

Jib Boom Cylinder Removal and Installation

1. Fully lower the outriggers and the upper and lower boom.
2. Extend the jib beam to raise the basket a few inches.
3. Place shoring under the jib beam. Lower the beam onto the shoring to support the weight of the basket.
4. Place shoring under both rear corners of the basket. Adjust the shoring to relieve any binding torque load on the upper jib beam pivot pins.
5. Remove the four keeper pins from the upper jib beam pivot pins (Figure 4-9). Secure the keeper pins to the mating beam for use during cylinder installation.

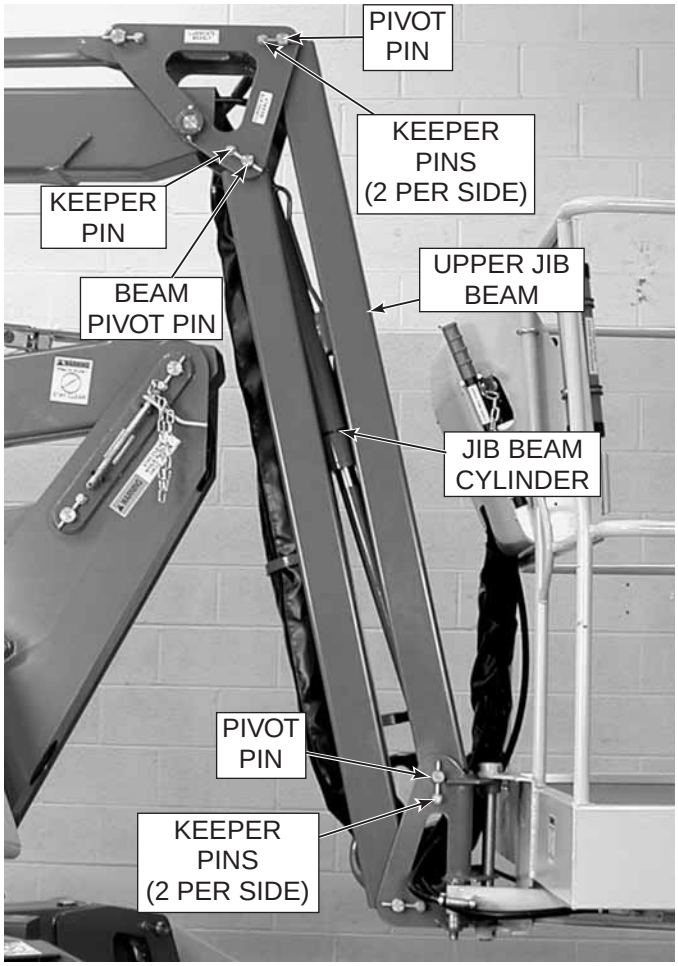


Figure 4-9. Jib Boom Components

6. Try to rotate one of the upper jib beam pivot pins with a keeper pin. Adjust the rear basket shoring as needed to enable pivot pin movement.

7. Remove the upper jib beam pivot pin at the top end of the beam. If needed, drive out the pivot pin with a hammer and a brass or hardwood drift.
8. Before removing the bottom pivot pin, insert a long blade screwdriver through the top pivot pin bores.
9. Remove the pivot pin at the bottom end of the upper jib beam. If needed, drive out the pivot pin with a hammer and a brass or hardwood drift. Remove the upper jib beam.
10. Fully retract the jib beam cylinder. Turn off the key switch and remove the key.
11. Tag the hydraulic hoses that connect to the left and right ports of the cylinder valve block.
12. Sketch the location of wire ties that secure the hydraulic hoses at the cylinder. The hoses must be properly secured to prevent pinching during jib boom operation. Cut the wire ties from the jib boom cylinder hydraulic lines.
13. Place absorbent drip cloths below the cylinder ports. Remove the hydraulic hoses from the jib boom cylinder. Plug the hose fittings to prevent fluid leakage. Protect exposed cylinder ports with plugs and caps.
14. At the top of the cylinder, unscrew and remove the keeper pins from both sides of the boom pivot pin. Secure the keeper pins to the mating beam for use during cylinder installation.
15. Support the weight of the jib boom cylinder using an overhead hoist and lifting straps.
16. Drive out the pivot pin with a hammer and a brass or hardwood drift and remove the jib boom cylinder.
17. After repairing the hydraulic cylinder, reinstall the cylinder in the reverse order of removal.
18. Power up the hydraulic system and check for leakage. Tighten the hydraulic fittings as needed.
19. Bleed entrapped air from the hydraulic cylinder according to instructions in paragraph 4-4.

Basket Swivel Cylinder Removal and Installation

1. Fully lower the outriggers and raise the upper boom. Position the basket for easy access to the hydraulic cylinder (Figure 4-10) mounted on the bottom of the work basket.

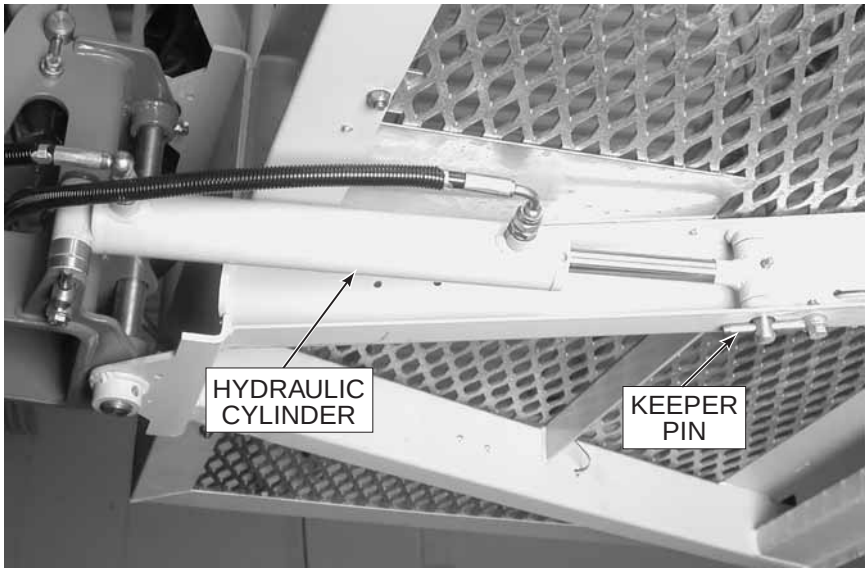


Figure 4-10. Basket Swivel Cylinder

2. Place absorbent drip cloths below the cylinder ports. Remove the hydraulic hoses from the jib boom cylinder. Plug the hose fittings to prevent fluid leakage. Protect exposed cylinder ports with plugs and caps.
3. Remove the keeper pins from both ends of the cylinder. Remove the hydraulic cylinder.
4. Secure the keeper pins to the mating beam for use during cylinder installation.
5. After repairing the hydraulic cylinder, reinstall the cylinder in the reverse order of removal.
6. Power up the hydraulic system and check for leakage. Tighten the hydraulic fittings as needed.
7. Bleed entrapped air from the hydraulic cylinder according to instructions in paragraph 4-4.

4-5 SLEW RING BEARING

Check Free Play

Check the free play of the slew ring bearing every six months. If the recommended maintenance schedule is followed, there should be little or no wear of the slew ring bearing. Check the slew ring bearing free play according to the following procedure:

1. Fully retract (lower) the lift booms.
2. Go to the hydraulic reservoir side of the boom lift. Open the power cabinet.
3. Access the top surface of the slew ring gear near the front end (trailer tow end) of the gear. This area is below and behind the hydraulic pump reservoir.
4. Insert a 2-inch (50 mm) caliper or bore micrometer at the top front surface of the slew ring gear.
5. Measure the distance from the top of the slew ring gear to the horizontal plate above the gear (Figure 4-11). Record the measurement.
6. Place a 175 lb (80 kg) load in the boom lift basket.
7. Raise the lower boom until the front of the boom is about 11.5 ft (3,5 m) from the ground.
8. Slowly raise the upper boom and extend the jib boom until both are horizontal.
9. Repeat the measurement in step 5. Record the measurement.
10. If the difference between the measurements in step 5 and step 9 is greater than 0.25 inch (6,35 mm) the slew ring bearing should be replaced. Notify Bil-Jax for bearing replacement instructions or assistance.

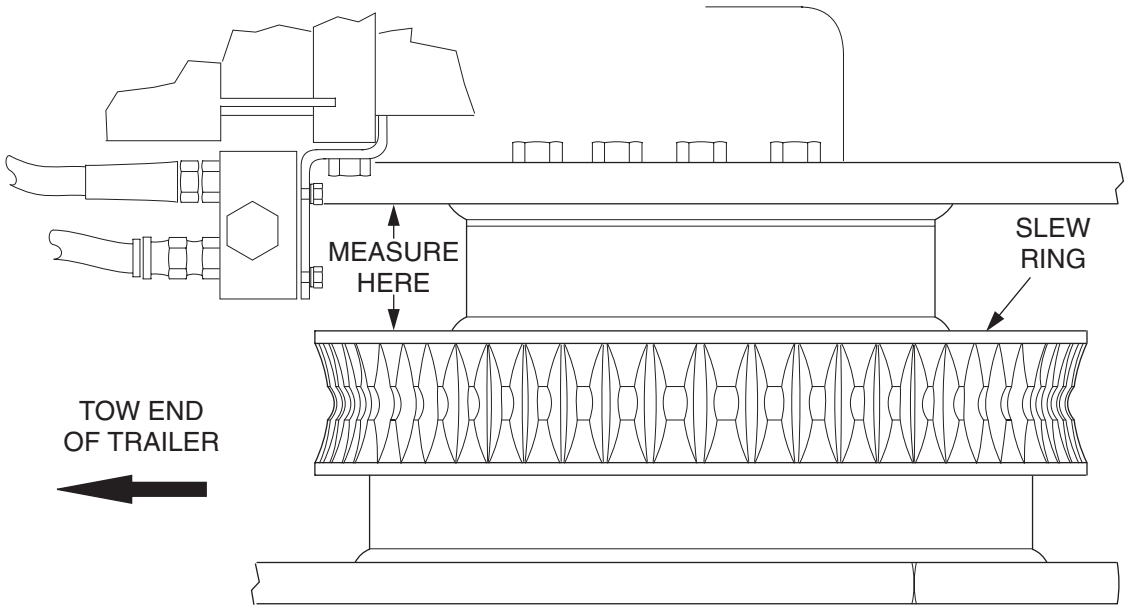


Figure 4-11. Slew Ring Position Measurement

4-6 LIMIT SWITCH CHECKS AND ADJUSTMENTS

Adjusting Boom Down Limit Switch

When the upper and lower booms are retracted, the boom down limit switch is actuated. The boom down limit switch must be actuated to lower or raise the outriggers. The boom down limit switch should trip when the lower boom is within 2 inches (50 mm) of seating on the trailer tongue. You may not be able to extend or retract the outriggers if the boom down limit switch is loose, damaged, or not adjusted properly.

Use the following procedure to readjust the boom down limit switch:

1. Lower the outriggers and raise the lower boom for free access to the limit switch, Figure 4-12.
2. Inspect the limit switch for loose mounting or visible damage. If the mounting hardware is loose, tighten the hardware. If the limit switch is damaged, replace the limit switch.
3. Measure the free height of the limit switch actuator roller. The top of the roller should be 0.75 inch (19 mm) above the limit switch mounting plate. Adjust the actuator position as needed.
4. Fully lower the upper and lower booms.
5. Press the outrigger run pushbutton to verify that the boom down limit switch is engaged. The hydraulic pump motor should run when the outrigger run pushbutton is pressed.
6. If the pump motor does not run, the limit switch or switch wiring is damaged. Repair or replace a damaged limit switch or wiring, as needed.

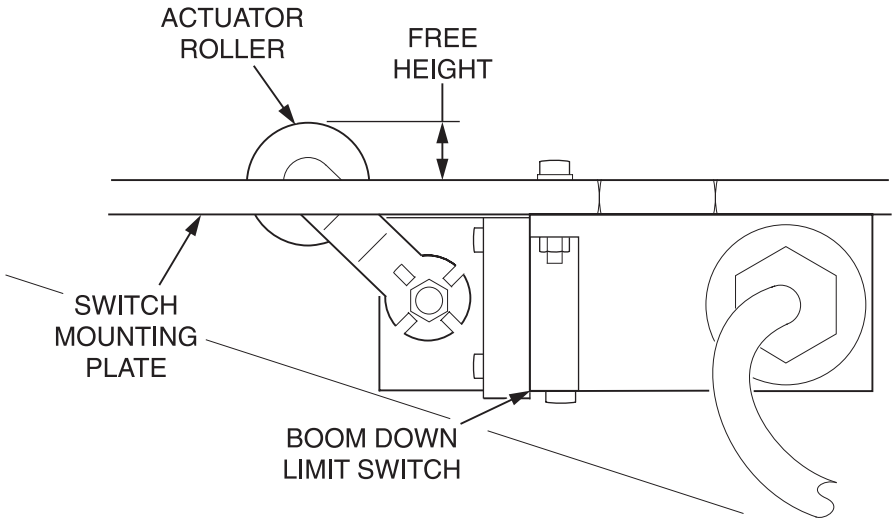


Figure 4-12. Boom Down Limit Switch

Adjusting Outrigger Position Switches

The outrigger position switches are set up to detect when the boom lift load is transferred from the trailer wheels to the outriggers. When the load is transferred to each outrigger, the related position switch is engaged and the related LED lights up on the control panel. All four position switch circuits must be engaged to enable lift boom operation. Use the following procedure to check and adjust the outrigger position switches.

1. Inspect the outrigger position switches for loose mounting or visible damage. If the mounting hardware is loose, tighten the hardware. If a position switch is damaged, replace the switch.
2. Lower the outriggers and raise the trailer wheels off the ground. Verify that all four outrigger LEDs light up.
3. If an LED is lit before the outrigger is lowered or if an LED fails to light when the outrigger is lowered, check the adjustment of the related outrigger position switch as follows:
    a. Measure the distance between the actuator roller and the outrigger pivot, Figure 4-13. The roller should be 1/8 inch (3 mm) from the outrigger pivot. Adjust the actuator as needed.
    b. If the actuator is correctly adjusted, but the LED fails to light up or go dim, check the switch, LED, and wiring. Repair or replace the faulty component. Refer to the detailed electrical diagram in Figure 4-15.

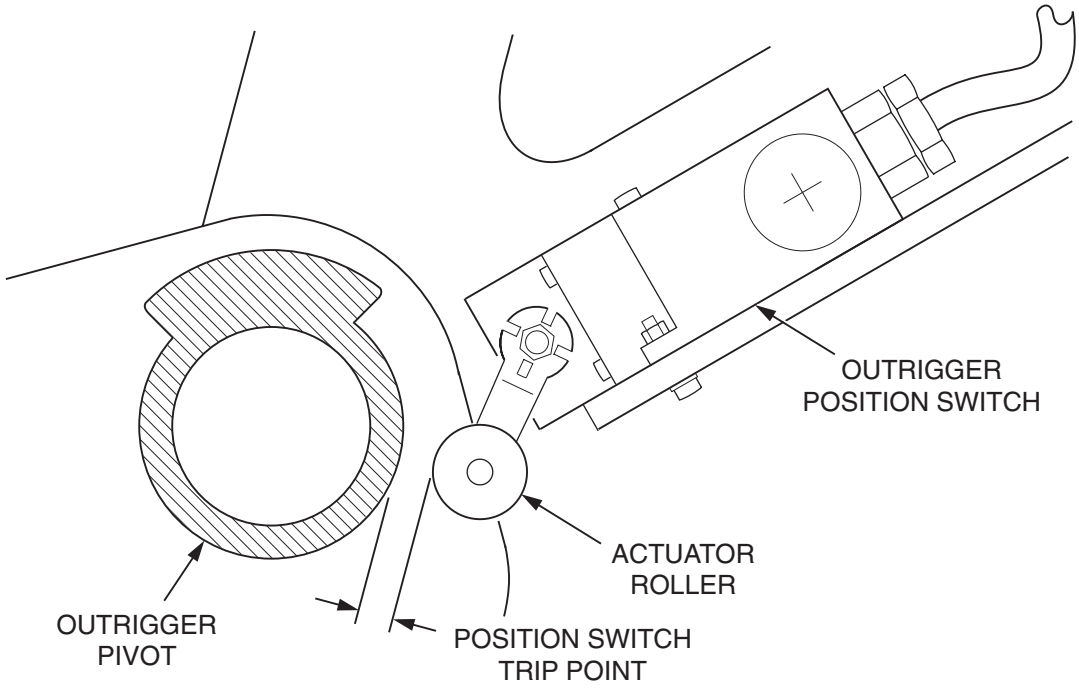


Figure 4-13. Outrigger Position Switch

4-7 TROUBLESHOOTING

Table 4-3. Troubleshooting Chart

Problem	Cause	Correction
1. Engine or motor will not start.	a. Emergency stop engaged (pushed in).	a. Rotate emergency stop buttons clockwise to disengage.
	b. Battery charge is low.	b. Check charge level. Recharge battery if needed.
	c. Battery ground or in-series cable loose.	c. Check for and repair loose battery connections or ground fault.
	d. Main circuit breaker tripped or switched off.	d. Reset main circuit breaker inside ground control panel.
DC model only	a. Main disconnect unplugged.	a. Plug in main disconnect.
	b. Fuse F2 burned out. Fuse is mounted on front inner wall of boom pivot weldment, in series with the positive battery cable.	b. Correct cause of short circuit and replace fuse.
	c. Motor contactor failed.	c. Replace motor contactor.
	d. Pump motor failed.	d. Check pump motor operation; repair or replace motor if faulty.
Gas model only	a. Engine key switch in wrong position.	a. Turn key switch to run position.
	b. Fuel tank empty.	b. Refill fuel tank.
	c. Engine oil level low.	c. Check/add engine oil.
	d. Spark plug fouled or damaged.	d. Check/replace spark plug.
	e. Fuse F2 burned out. Fuse is mounted inside engine key switch housing.	e. Correct cause of short circuit and replace fuse.
	f. Starter relay or starter motor failed.	f. Replace failed starter relay or motor.
2. Pump motor runs, but outriggers will not extend.	a. Basket/ground key switch in wrong position.	a. Turn key switch to ground position.
	b. Hydraulic oil level low.	b. Check hydraulic oil level in reservoir. Add oil as needed.
	c. Boom down limit switch or switch wiring failed.	c. Check boom down limit switch and wiring operation per paragraph 4-6.
	d. Hydraulic gear pump failed.	d. Check pump; replace if hot to touch.
DC model only	a. Boom enable valve SV1 faulty (sticking open) (see item 4, Figure 6-19).	a. Repair or replace faulty valve.
Gas model only	a. Outrigger enable valve solenoid SV2 failed (see item 6, Figure 6-18).	a. Replace faulty wiring or solenoid.
	b. Boom enable valve SV1 faulty (sticking open) (see item 1, Figure 6-18).	b. Repair or replace faulty valve.

Table 4-3. Troubleshooting Chart, Continued

3. Pump motor runs, but upper and lower boom lift functions do not work.	a. Basket/ground key switch in wrong position.	a. Turn key switch to enable basket or ground controls.
	b. Boom lift out of level.	b. Operate outriggers to level boom lift.
	c. Outrigger not under load.	c. Check that all outriggers support a load; adjust outriggers as needed.
	d. Hydraulic oil level low.	d. Check hydraulic oil level per paragraph 4-4. Add oil as needed.
	e. Boom enable valve solenoid SV1 failed (see item 1, Figure 6-18 or item 4, Figure 6-19).	e. Replace faulty wiring or solenoid.
	f. Hydraulic output filter dirty.	f. Check pump output pressure, no load. Replace filter if pump output pressure reaches 30 psig (206 kPa gage) with no hydraulic function selected.
	g. Hydraulic gear pump failed.	g. Check pump; replace if hot to touch.
4. Pump motor runs, but the upper and lower booms will not retract.	a. Obstruction below basket or boom.	a. Raise and reposition the boom to avoid the obstruction.
	b. Basket/ground key switch in wrong position.	b. Turn key switch to ground or basket run position.
	c. Boom lift shifted out of level.	c. If out of level alarm is sounding, manually lower boom.
	d. Outrigger not under load.	d. Check that all outriggers support a load. If not, manually lower boom.
	e. Hydraulic oil level low.	e. Manually lower boom. Check oil level in reservoir; add oil as needed.
	f. Boom enable valve solenoid SV1 failed (see item 1, Figure 6-18 or item 4, Figure 6-19).	f. Manually lower boom. Repair faulty wiring or replace failed solenoid.
5. Pump motor runs, but the boom rotate function does not work.	a. Basket/ground key switch in wrong position.	a. Turn key switch to ground or basket position.
	b. Boom lift out of level.	b. Operate outriggers to level boom lift.
	c. Outrigger not under load.	c. Check that all outriggers are supporting a load; adjust as needed.
	d. Hydraulic oil level low.	d. Check hydraulic oil level in reservoir. Add oil as needed.
	e. Rotate obstruction or hard stop reached.	e. Rotate boom in opposite direction.
	f. Slew ring bearing worn and binding.	f. Retract boom and retry rotation. Replace slew ring bearing if worn.
6. One hydraulic boom or outrigger function fails to work.	a. Control valve failed; leaking.	a. Repair or replace control valve if hot to touch.
	b. Cylinder counterbalance valve failed; leaking.	b. Counterbalance valves are in cylinder manifold blocks. Repair or replace valve if hot to touch.
	c. Cylinder failed; leaking.	c. Touch cylinder wall near piston; repair or replace cylinder if hot touch.

Troubleshooting Aids

Electrical diagrams are provided in Figure 4-14 through Figure 4-17. Hydraulic diagrams are provided in Figure 4-18 and Figure 4-19. Level sensor LED indications are shown in Table 4-4.

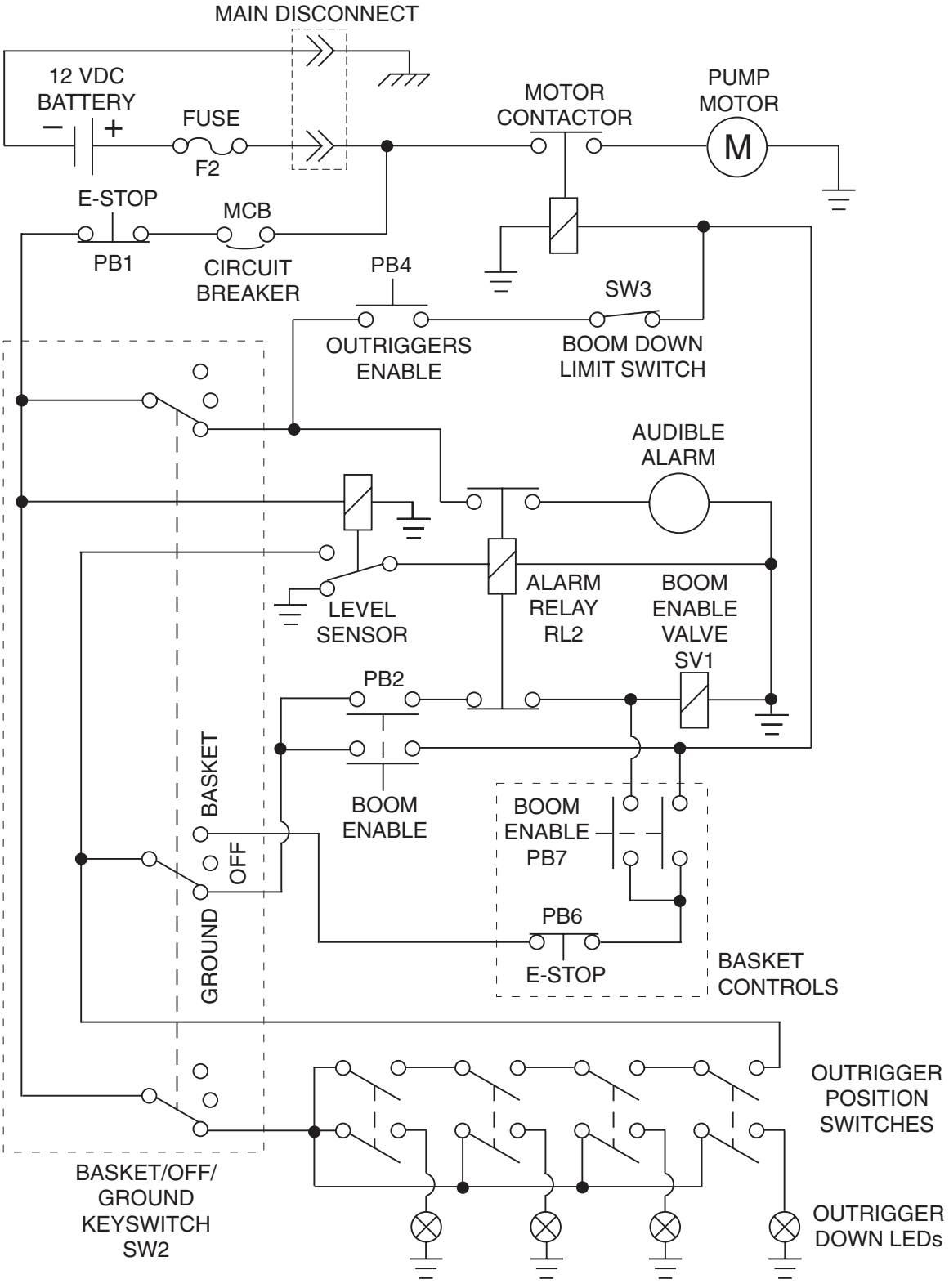


Figure 4-14. Simplified Electrical Diagram, DC Model

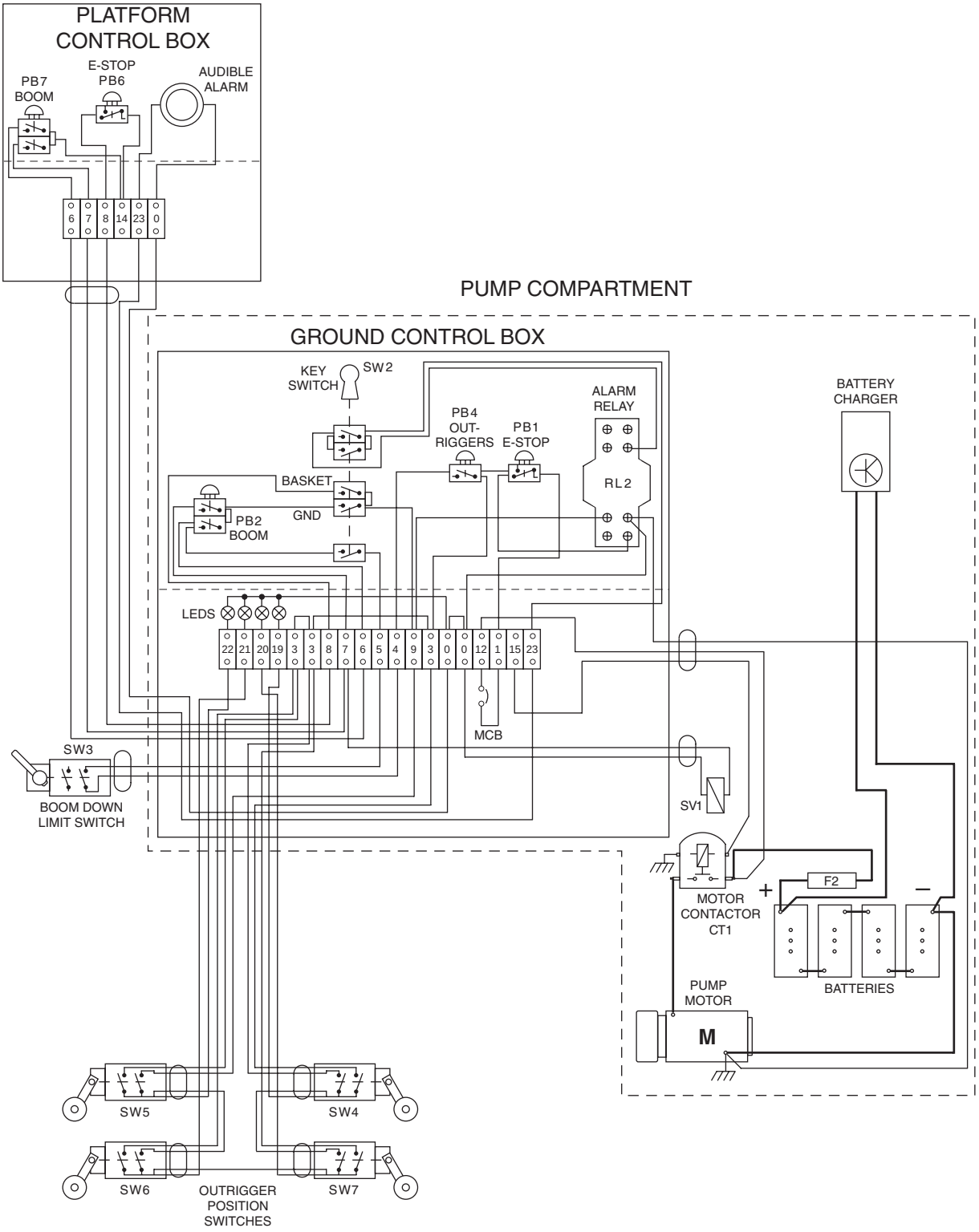


Figure 4-15. Detailed Electrical Diagram, DC Model

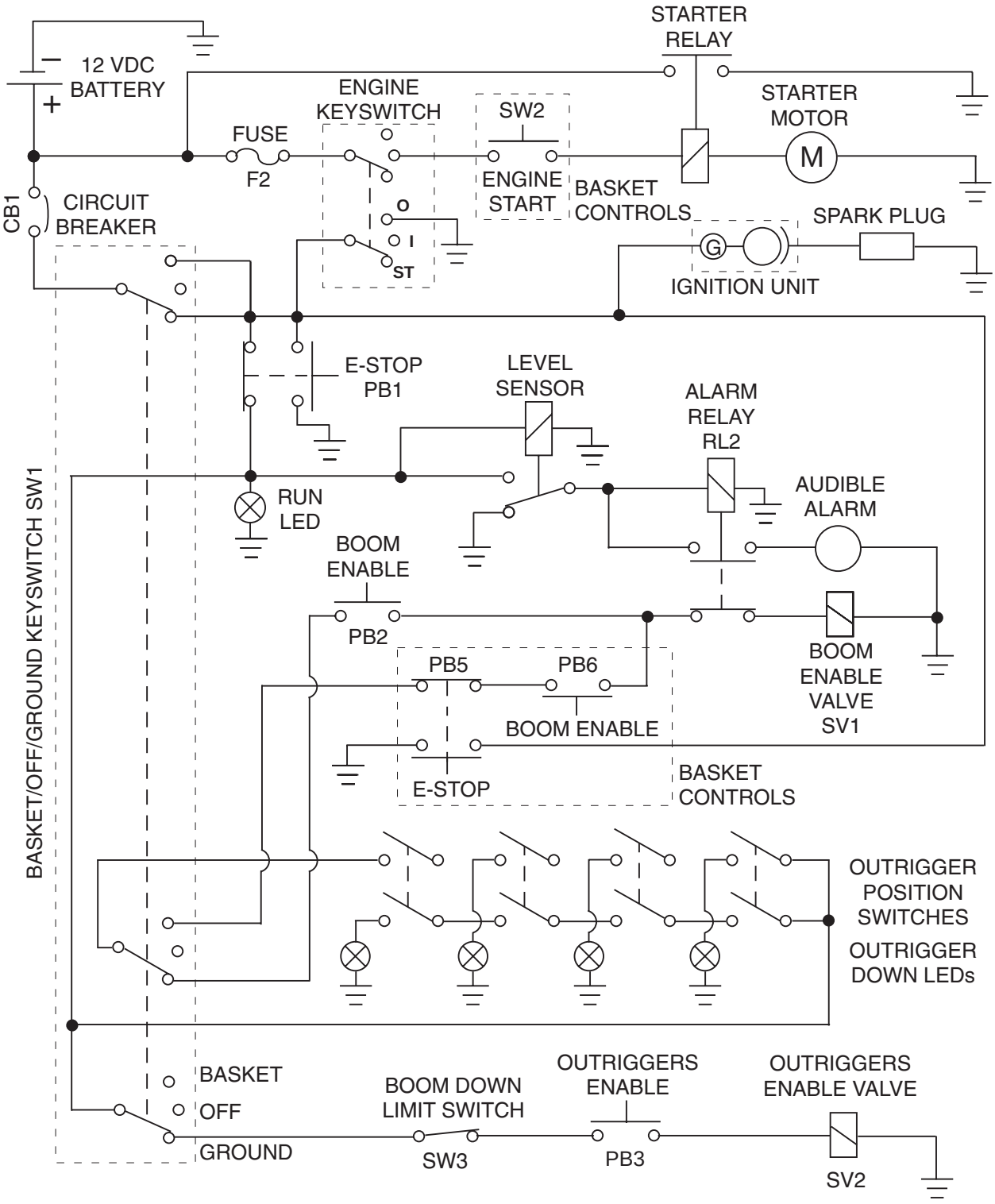


Figure 4-16. Simplified Electrical Diagram, Gas Model

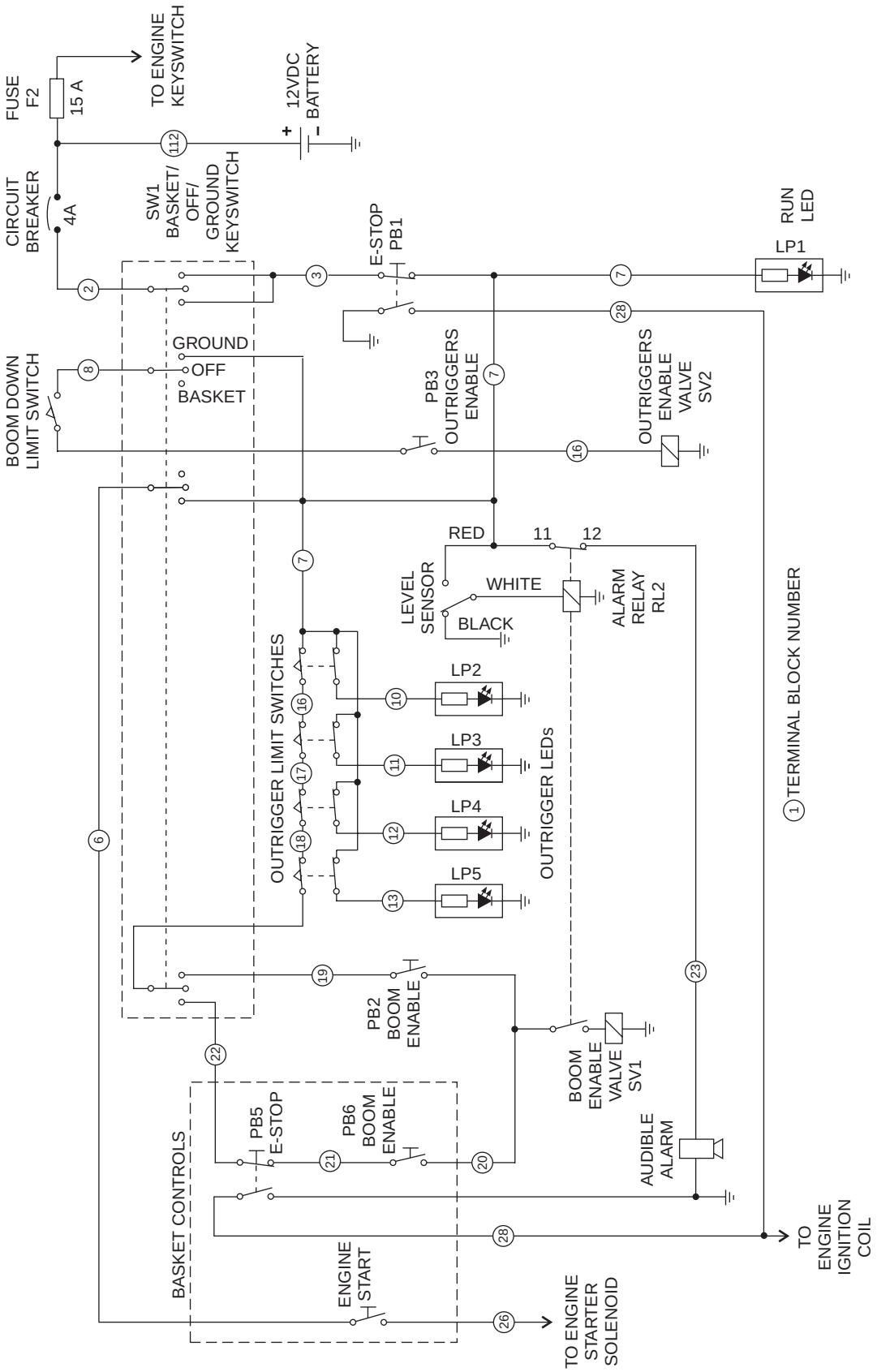


Figure 4-17. Detailed Electrical Diagram, Gas Model

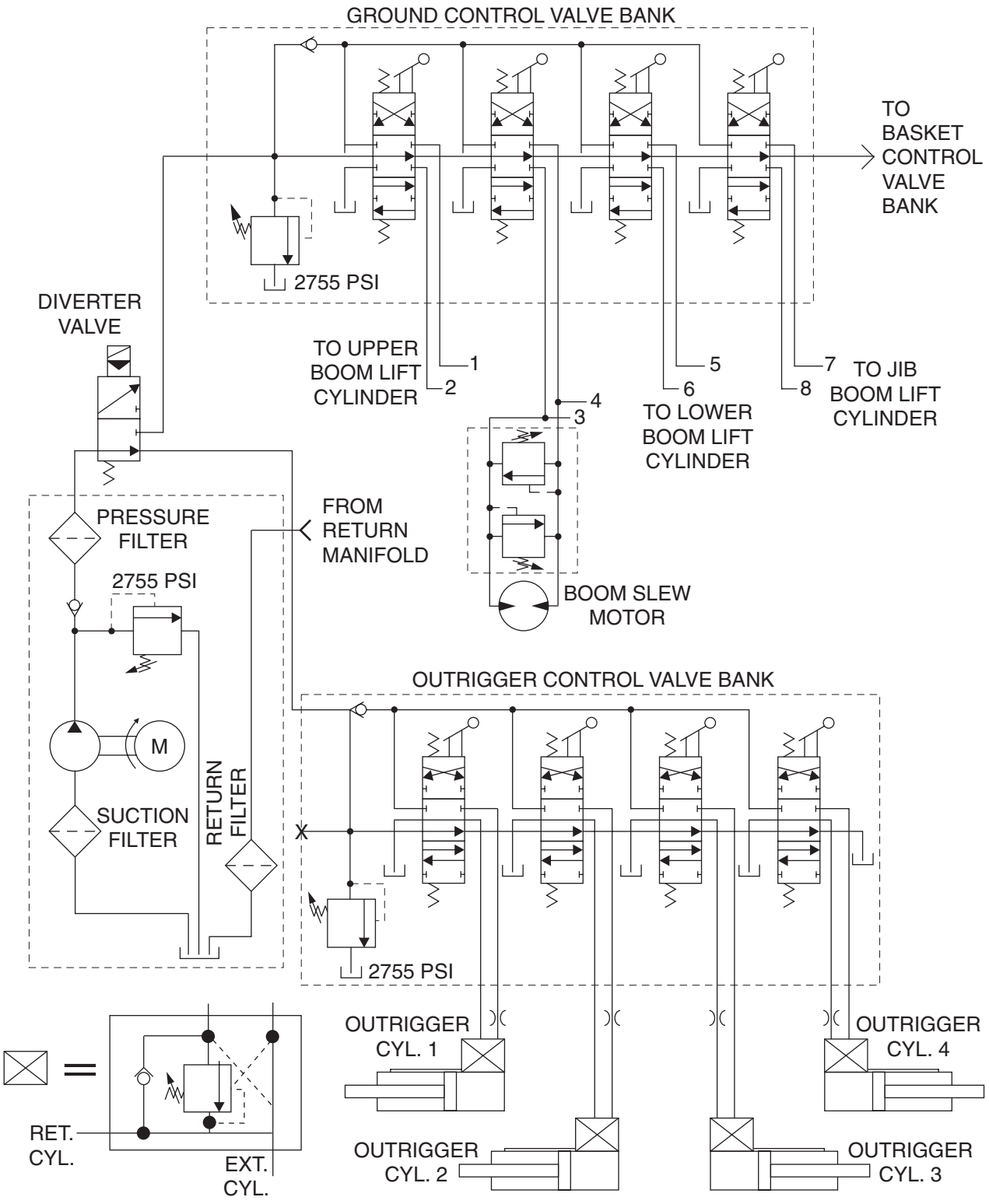


Figure 4-18. Hydraulic Diagram, DC Model, Sheet 1 of 2

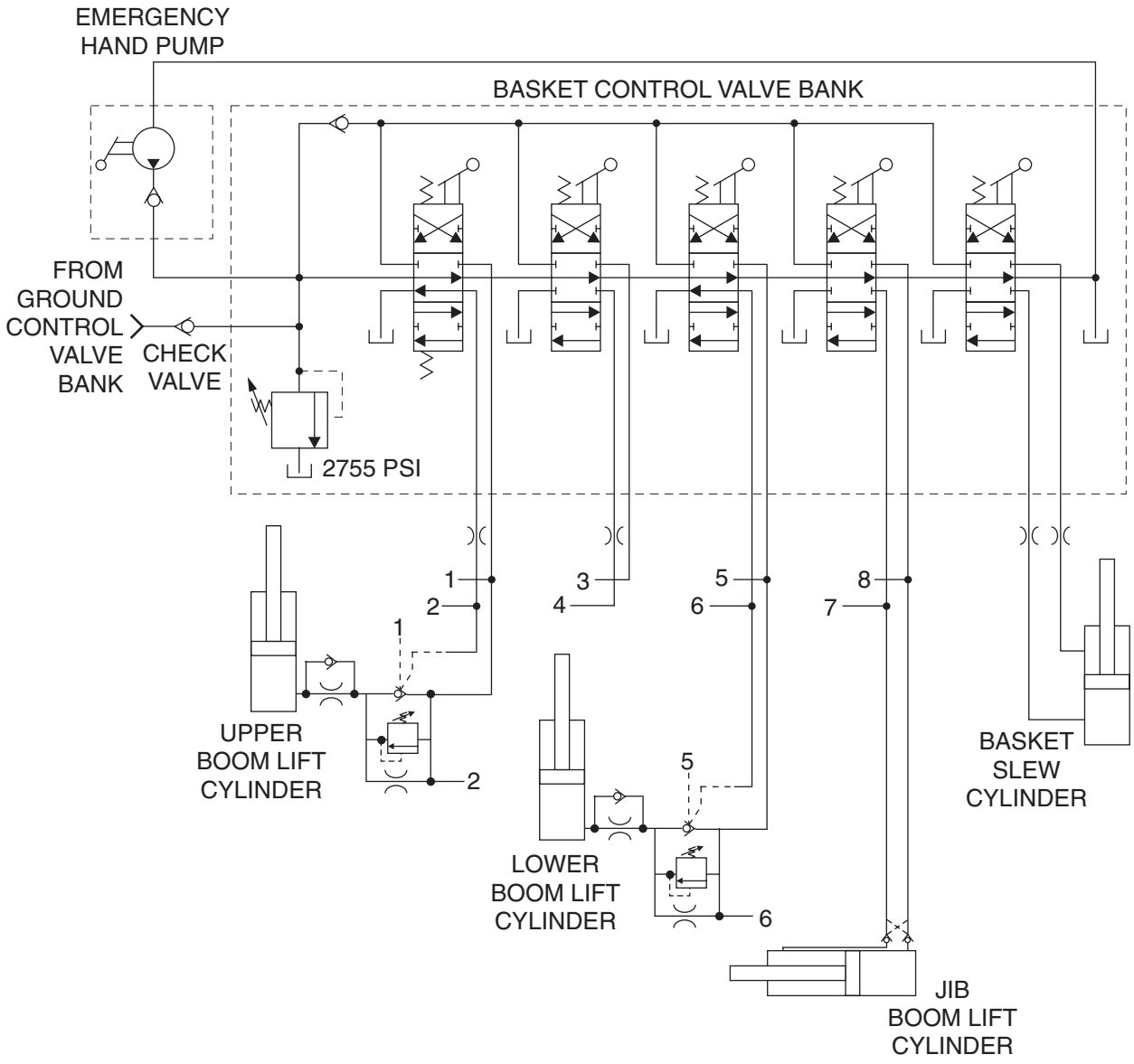


Figure 4-18. Hydraulic Diagram, DC Model, Sheet 2 of 2

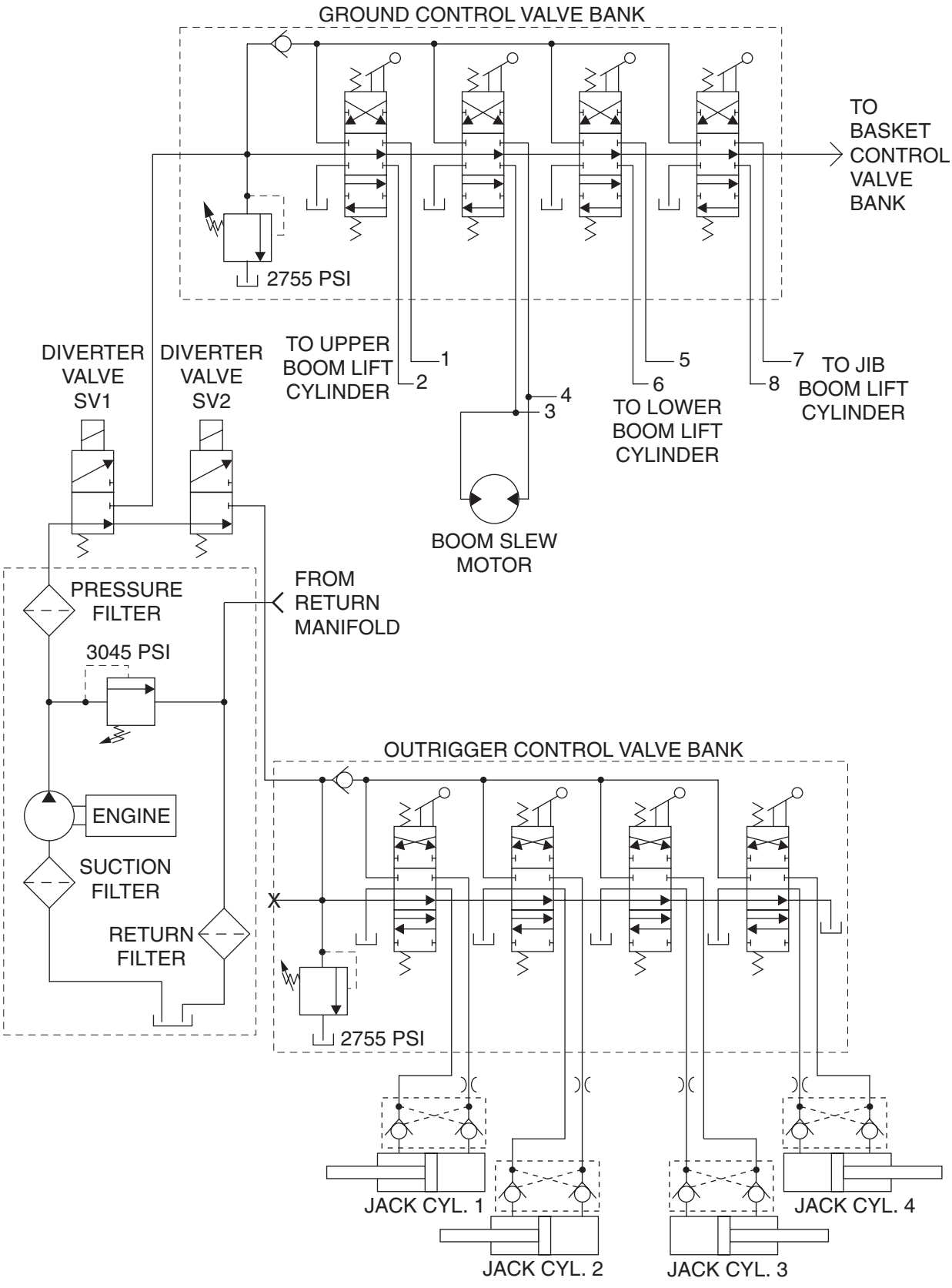


Figure 4-19. Hydraulic Diagram, Gas Model, Sheet 1 of 2

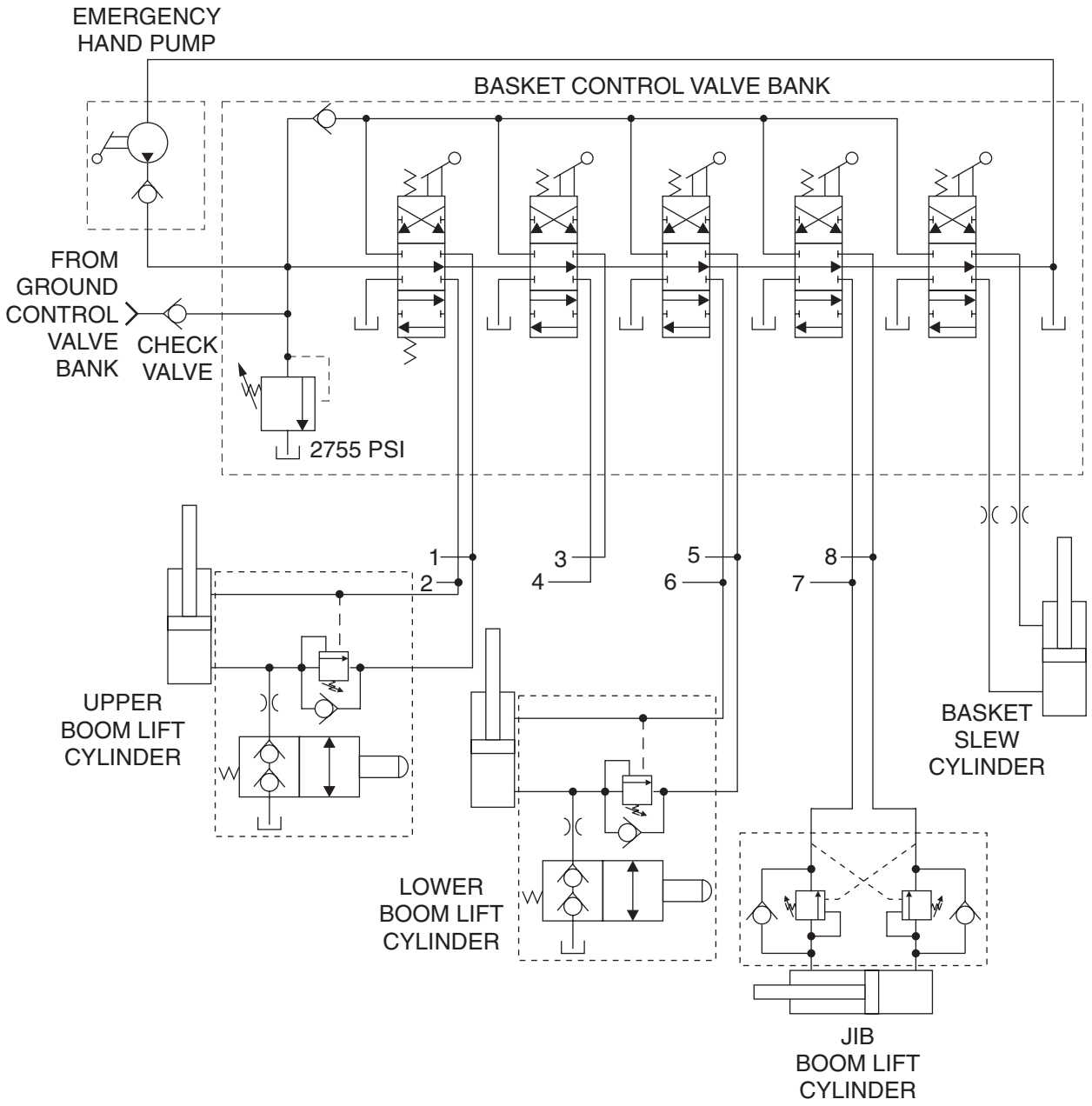


Figure 4-19. Hydraulic Diagram, Gas Model, Sheet 2 of 2

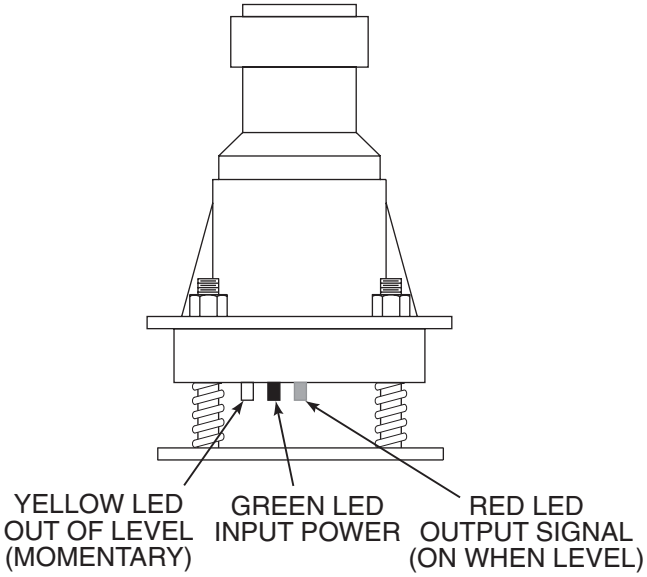


Figure 4-20. Level Sensor

Table 4-4. Level Sensor LEDs

Color	Description
Yellow	Boom lift out of level. Signals alarm after 2 second delay.
Green	Boom lift power is on.
Red	Boom lift level. Goes out after time delay.

4-8 MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET
FOR LEAD ACID BATTERIES, WET, FILLED WITH ACID

SECTION I: GENERAL INFORMATION

Manufacturer's Name:	Crown Battery Mfg. Company	EMERGENCY NO:	800 487-2879
Street Address:	1445 Majestic Drive	OR	800 OIL-TANK
City, State, Zip	Fremont, Ohio 43420		
Phone Number:	419 334-7181	REVISION DATE:	5/18/2000

SECTION II: MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS Hazardous Components 1% or greater Carcinogens 0.01% or greater	PERCENT	OSHA PEL	ACGIH TLV	OTHER LIMITS	CAS NUMBER
METALLIC LEAD METAL	25.5%	0.05 mg/m3	0.05 mg/m3	NONE	7439-92-1
LEAD SULFATES	18.2%	0.05 mg/m3	0.05 mg/m3	NONE	7439-92-1
LEAD OXIDES	18.0%	0.05 mg/m3	0.05 mg/m3	NONE	7439-92-1
POLYPROPYLENE CASE MTL	6.4%				
SEPARATORS	3.5%				
SULFURIC ACID(H2SO4)	5.2%	1.0 mg/m3	1.0 mg/m3	NONE	7664-93-9
WATER	19.2%				

REGULATORY INFORMATION: Those ingredients listed above are not subject to the reporting requirements of 313 of Title III of the Superfund Amendments and Reauthorization Act. The items are covered in an exemption as a "Manufactured Article". 372.30(b)

SECTION III: PHYSICAL / CHEMICAL CHARACTERISTICS

Boiling Point	Approximately 203F	Vapor Density:	Greater Than 1
Vapor Pressure	14 @ 37% @ 80 F	Melting Point:	-36 F to -10.6 F
Solubility in Water	100%	Water Reactive:	Yes, Produces Heat
Specific Gravity	1.245 - 1.295 Battery Electrolyte		
Appearance & Odor	Clear Liquid with Sharp Pungent Odor		

SECTION IV: FIRE AND EXPLOSION HAZARD DATA:

Flash Point: Not Combustible
Auto Ignition Temperature N/A Flammabiltiy Limits in Air % by Volume: N/A
Extinguishing Media: Dry Chemical Carbon Dioxide, Water Fog, Water
Special Fire Fighting Procedures: Sulfuric Acid Fumes, Sulfur Dioxide Gas or Carbon Monoxide may be released when acid decomposes. Wear NIOSH approved self contained breathing apparatus.

Unusual Hazards: Water applied to sulfuric acid generates heat and causes acid to splatter. Wear full-cover acid resistant clothing. Sulfuric acid reacts violently with metals, nitrates, chlorates, carbides, fulminates, picrates and other organic materials. Reacts with most metals to yield explosive/flammable hydrogen gas. This reaction is intensified when sulfuric acid is dilluted with water to form battery electrolyte.

MATERIAL SAFETY DATA SHEET
FOR LEAD ACID BATTERIES, WET, FILLED WITH ACID (Continued)

****

SECTION V -- HEALTH HAZARD DATA

****

Primary Routes of Entry: Inhalation: YES
Skin: YES
Ingestion: YES
Health Hazards: Acute EYES, SKIN, RESPIRATORY SYSTEM & DIGESTIVE SYSTEM
Chronic: EYES, SKIN, RESPIRATORY SYSTEM & DIGESTIVE SYSTEM
Signs and Symptoms of Exposure: IRRITATION OF EXPOSED AREA, BURNS AND RESPIRATORY PROBLEMS
NO POSSIBILITY OF EXPOSURE OF LEAD WILL OCCUR UNLESS BATTERY IS DESTROYED.
Medical Conditions Generally Aggravated By Exposure: EXPOSURE TO MIST MAY CAUSE LUNG DAMAGE & AGGRAVATE PULMONARY CONDITION.
Emergency First Aid Procedures: SEEK MEDICAL ASSISTANCE FOR FURTHER TREATMENT, OBSERVATION AND SUPPORT IF NECESSARY.
Eye Contact: WASH WITH COPIOUS QUANTITIES OF COOL WATER FOR AT LEAST 15 MINUTES
Skin Contact: FLUSH AREA WITH LARGE AMOUNTS OF COOL WATER FOR AT LEAST 15 MINUTES
Inhalation: REMOVE TO FRESH AIR, IF BREATHING IS DIFFICULT - GIVE OXYGEN
Ingestion: GIVE MILK TO DRINK, DO NOT INDUCE VOMITTING. CALL PHYSICIAN

****

SECTION VI -- REACTIVITY DATA

****

Stability: STABLE Conditions to Avoid: N/A
Incompatibility: AVOID COMBUSTIBLES, ORGANIC MATERIALS, AND STRONG REDUCING AGENTS
Hazardous Decomposition Products: SULFUR TRIOXIDE, CARBON MONOXIDE, SULFURIC ACID FUMES, & SULFUR DIOXIDE
Hazardous Polymerization: MAY OCCUR Conditions to Avoid: N/A

****

SECTION VII -- SPILL OR LEAK PROCEDURES

****

Steps to be taken in case material is released or spilled:
CONTAIN SPILL, USING NON-COMBUSTIBLE MATERIALS: VERMICULITE, DRY SAND & EARTH. NEUTRALIZE WITH LIME, SODA ASH, SODIUM BICARBONATE, ETC.
Waste disposal method: CONSULT STATE ENVIRONMENTAL AGENCY. INDIVIDUAL STATE REGULATIONS VARY
Precautions to be taken in Handling & Storage: SEPARATE FROM INCOMPATIBLE MATERIALS, KEEP AWAY FROM FIRE, SPARKS AND HEAT
Other Precautions and/or Special Hazards:
CONTACT WITH METALS MAY PRODUCE TOXIC SULFUR DIOXIDE FUMES & MAY ALSO RELEASE FLAMMABLE HYDROGEN GAS. THIS REACTION IS INTENSIFIED WHEN DILUTED.

NFPA Rating:	HEALTH: 3	FLAMMABILITY:	0	REACTIVITY:	2	SPECIAL: 0	
HMIS Rating:	HEALTH: 3	FLAMMABILITY:	0	REACTIVITY:	2	PERSONAL PROTECTION: X	

****

SECTION VIII -- CONTROL AND PROTECTIVE MEASURES

****

Respiratory Protection: ABOVE P.E.L.: NIOSH APPROVED, FITTED, FULL FACE RESPIRATOR
Protective Gloves: ACID RESISTANT
Eye Protection: FULL FACE PROTECTION
Ventilation: LOCAL EXHAUST: VENTILATED AREA PREFERRED
MECHANICAL: IF BELOW P.E.L.
SPECIAL: MUST BE ACID & EXPLOSIVE RESISTANT
OTHER: MUST BE ACID & EXPLOSIVE RESISTANT
Other Protective Equipment: ACID RESISTANT CLOTHING AND BOOTS
Hygienic Work Practices: N/A

MATERIAL SAFETY DATA SHEET
FOR AW–46 HYDRAULIC OIL

1-SITE SPECIFIC INFORMATION: AW-46 HYDRAULIC OIL

2-GENERAL INFORMATION TRADE NAME: AW-46 HYDRAULIC OIL
EMERGENCY TELEPHONE NUMBERS: (517) 849-2144
CHEMICAL FAMILY: LUBRICATING OIL
CAS NUMBER: MIXTURE: ISSUE DATE 12/15/96
HAZARDOUS INGREDIENTS:

CONTAINS NO INGREDIENTS NOW KNOWN TO BE HAZARDOUS AS DEFINED IN OSHA 29 CFR 1910.1000 AND OSHA 29 CFR 1910.1200.

HEALTH HAZARD DATA THRESHHOLD LIMIT VALUE: 5mg/m3 AS OIL MIST 8 hr, TWA
PRIMARY ROUTES OF ENTRY: INHALATION, SKIN ABRASION AND INGESTION.
CARCINOGENIC: NO
SYMPTOMS IF INGESTED, CONTACTED WITH SKIN, OR VAPOR INHALED: NO ADVERSE EFFECTS EXPECTED.
EYES: FLUSH WITH WATER FOR 15 MINUTES SKIN: WASH THOROUGHLY WITH WARM SOAPY WATER.
INGESTION: DO NOT INDUCE VOMITTING-SEEK MEDICAL ATTENTION.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: NONE KNOWN
AIR EXPOSURE LIMITS: P.E.L. NOT ESTABLISHED T.L.V.5mg/m3 OSHA 29 CFR 1910.1000
HEALTH: 1FIRE: 1SPECIFIC: XREACTIVITY: 0

PHYSICAL DATA: BOILING POINT: 400+ DEG F. VAPOR PRESSURE (PSIA): N/A
SPECIFIC GRAVITY (H20=1): 0.87 SOULUBILITY IN WATER: NEGLIGIBLE
PH OF CONCENTRATE: N/A
APPEARANCE AND ODOR: PALE YELLOW, PETROLEUM ODOR

FIRE AND EXPLOSION HAZARD DATAFLASH POINT(METHOD USED): 425 DEG F.
FLAMMABLE LIMITS: NOT DETERMINED LEL: N/AUEL: N/A
EXTINGUISHING MEDIA: SAND, DRY CHEMICAL, FOAM, CO2. TREAT AS CLASS B FIRE.
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

REACTIVIYY DATA STABILITY: STABLE CONDITIONS TO AVOID: AVOID EXTREMES OF HEAT.
INCOMPATIBILITY (MATERIALS TO AVOID): STRONG OXIDIZING MATERIALS.
HAZARDOUS DECOMPOSITION PRODUCTS: INCOMPLETE COMBUSTION MAY CAUSE CARBON OXIDES.
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

SPILL OR LEAK PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED. DIKE AND ABSORB ON INERT MATERIAL. FOLLOW ALL LOCAL, STATE, AND FEDERAL REGULATIONS FOR DISPOSAL OF COLLECTED MATERIAL.

MATERIAL SAFETY DATA SHEET
FOR AW–46 HYDRAULIC OIL (Continued)

SPECIAL PROTECTION INFORMATION RESPIRATORY PROTECTION (SPECIFIC TYPE)
NONE REQUIRED
VENTILATION: NORMAL LOCAL EXHAUST: NORMAL
MECHANICAL EXHAUST (GENERAL) X
PROTECTIVE GLOVES: OIL IMPERVIOUS GLOVES RECOMMENDED
EYE PROTECTION: SAFETY GLASSES RECOMMENDED
OTHER PROTECTIVE EQUIPMENT: NONE REQUIRED

SPECIAL INSTRUCTIONS SPECIAL LABELLING INSTRUCTIONS: NOT REQUIRED
SPECIAL PACKAGING RECOMMENDATIONS: NONE
HANDLING AND STORAGE RECOMMENDATIONS: DO NOT CUT OR WELD ON EMPTY CONTAINERS, AVOID EXTREMES OF COLD OR HEAT. STORE IN CLEAN DRY AREA.

DISCLAIMER: THE INFORMATION CONTAINED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BEST OF THE SELLERS KNOWLEDGE. THE SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

5
Replacement Decals

Refer to Table 5-1 and Figure 5-1 through Figure 5-5 for descriptions and locations of decals on the XLB-4319 Hydraulic Boom Lift.

Table 5-1. Replacement Decals

Decal No.	Description of Decal	Qty
B06-00-0033	CAUTION: THIS UNIT SHALL ONLY BE TOWED WHEN…	2
B06-00-0034	DANGER: …DURING CHARGING, EXPLOSIVE OXYHYDROGEN GAS…	1
B06-00-0036	LUBRICATE WEEKLY	22
B06-00-0037	LUBRICATE SEMI-ANNUALLY	1
B06-00-0043	MANUAL PUMP HANDLE	1
B06-00-0060	STOP…READ OPERATING…	1
B06-00-0062	THIS PLUG 115 VOLT	2
B06-00-0068	THE HYDRAULIC SYSTEM… (decal on hydraulic reservoir)	1
B06-00-0115	1500 WATT LOAD LIMIT	1
B06-00-0130	LUBRICATE MONTHLY	1
B06-00-0151	DANGER: 110 VOLT	1
B06-00-0161B	Bil-Jax – LARGE LABLE	2
B06-00-0167	Caution Tape, Black and Yellow	
B06-00-0173	SAFETY HARNESS LANYARD ATTACHMENT POINT	1
B06-00-0189	WARNING: LEVEL MACHINE BEFORE USE	1
B06-00-0192	OPERATION AND SERVICE MANUAL INSIDE	1
B06-00-0225	WARNING: STAY CLEAR WHILE RAISING …	5
B06-00-0261	CAUTION: ANSI DECAL	1
B06-00-0268	EMERGENCY ROTATION HANDLE	1

Decal No.	Description of Decal	Qty
B06-00-0334	DANGER: HIGH VOLTAGE OPERATION	2
B06-00-0363B	Bil-Jax – SMALL LABLE	2
B06-00-0380	MAXIMUM CAPACITY 450 LBS	1
B06-00-0393	Basket Station Valve Numbers	1
B06-00-0394	Basket Station Valve Motions	1
B06-00-0395	Ground Station Valve Numbers	1
B06-00-0396	Ground Station Valve Motions	1
B06-00-0397	LATCHED UNLATCHED	1
B06-00-0398	OUTRIGGER INSTRUCTIONS	1
B06-00-0399	ABBREVIATED OPERATING INSTRUCTIONS	1
B06-00-0400	DANGER: BEFORE USING, LOWER ALL 4 OUTRIGGERS	5
B06-00-0401	DANGER: BOOM SAFETY INSTRUCTIONS	2
B06-00-0402	BOOM LIFT INSTRUCTIONS BASKET	1
B06-00-0403	PUSH TO LOWER	2
B06-00-0404	WARNING: STAND CLEAR OF OUTRIGGER…	4
B06-00-0405	WARNING: PINCH POINT…	10
B06-00-0406	XLB-4319 TRANSFER	2
B06-00-0409	EMERGENCY ROTATION GEAR	1
B06-00-0430	XLB–4319 SPECIFICATIONS	1

EMERGENCY ROTATION GEAR
FTC B06-00-0409

B06-00-0409

LUBRICATE WEEKLY
COIA B06-00-0036

B06-00-0036

DANGER

FAILURE TO COMPLY WITH THE FOLLOWING INSTRUCTIONS OR ANY OTHER IMPROPER USE OR MAINTENANCE OF THIS EQUIPMENT WILL RESULT IN INJURY OR DEATH.

- Risk of Electric Shock
  DO NOT expose charger to rain, power wash detergents or spray - **DO NOT** use frayed or damaged electric cords when charging.
- During charging, explosive oxyhydrogen gas is generated. **DO NOT** smoke or allow open fire, sparks, or embers near battery when charging.
- Connect input cord only to properly grounded three wire outlet with specified voltage and frequency.
- **Always** wear safety goggles and face shield when working on or near battery.
- Check battery acid level at the start of each day. If acid does not cover the plates, add only enough distilled or demineralized water to completely cover the plates.
- Keep terminals and terminal connections clean.
- Consult Operation and Maintenance Manual for additional information on battery maintenance.

B06-00-0034 RIR/OFG

B06-00-0034

MAXIMUM CAPACITY
450 LBS.
CCTT B06-00-0380

B06-00-0380

LUBRICATE MONTHLY
RIF B06-00-0130

B06-00-0130

LUBRICATE SEMI-ANNUALLY
COIA B06-00-0037

B06-00-0037

MANUAL PUMP HANDLE
COIA B06-00-0043

B06-00-0043

WARNING
PINCH POINT

STAY CLEAR
FTC © Bil-Jax, Inc. 2004 B06-00-0405

B06-00-0405

THIS PLUG 115 VOLT
RIL B06-00-0062

B06-00-0062

EMERGENCY ROTATION HANDLE
OFA B06-00-0268

B06-00-0268

SAFETY HARNESS LANYARD ATTACHMENT POINT
UFC B06-00-0173

B06-00-0173

CAUTION

THIS UNIT SHALL ONLY BE TOWED WHEN ALL BOOM SECTIONS ARE FULLY DOWN AND LOCKED WITH TRANSPORT SAFETY PINS.
COIA/RFT B06-00-0033

B06-00-0033

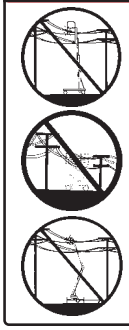
CAUTION

This machine is designed and manufactured in compliance with the ANSI A92.2 standard in force on the date of manufacture. Dealers, owners, users, operators, lessors, and lessees are responsible for inspection, maintenance, training, and operation as required by A92.2 and the owners manual.

Alterations, modifications, or changes to this machine without the written authorization of Workforce Products, Inc. as well as any unauthorized adjustment of valves, disabling or by-passing of safety devices or the improper use of this machine shall exempt Workforce Products, Inc. from any liability for any resulting injuries or damage.
FFU B06-00-0261

B06-00-0261

DANGER



IT IS UNLAWFUL TO OPERATE THIS EQUIPMENT WITHIN 10 FEET OF HIGH VOLTAGE LINES OF 50,000 VOLTS OR LESS.

For safe clearance of lines in excess of 50,000 volts, see owners manual.

This machine is NOT insulated. Do not use within 10 ft. of power lines or other electrically charged sources. This machine DOES NOT provide protection for personnel from contact with or close proximity to any live electrical power source and should be considered energized by all personnel coming in contact with machine.
FFL B06-00-0334

B06-00-0334

OPERATION AND SERVICE MANUAL INSIDE
COFC B06-00-0192

B06-00-0192

DANGER
110 VOLT
GFT/LFC B06-00-0151

B06-00-0151

WARNING
- Level machine before use.
- Failure to level this machine could result in serious injury or death!

LFC B06-00-0189

B06-00-0189

BIL-JAX

B06-00-0161B

WARNING
STAY CLEAR WHILE RAISING OR LOWERING
CCFO B06-00-0225

B06-00-0225

XLB-4319

B06-00-0406

BIL-JAX

B06-00-0363B

Figure 5-1. Replacement Decals, Sheet 1 of 3

ABBREVIATED OPERATING INSTRUCTIONS

WARNING IMPROPER USE OF THIS EQUIPMENT WILL RESULT IN SERIOUS INJURY OR DEATH. THIS MACHINE MUST NOT BE OPERATED UNLESS YOU ARE COMPLETELY FAMILIAR WITH THE INSTRUCTIONS CONTAINED IN THE OPERATING MANUAL

UNHITCHING

Machine must be unhitched from vehicle before setting up.
1. Apply hand brake.
2. Remove lighting plug and safety wire from vehicle.
3. Lower trailer tongue jack.
4. Release trailer hitch from vehicle.

SETTING UP

1. Read Operation Manual and all decals prior to operation.
2. Check to be sure all personnel are clear of outriggers.
3. Select ground controls with key switch.
4. Make sure emergency stop buttons are released.
5. Using outrigger levers, lower each outrigger to within 6" from ground.
6. Lower the two outriggers closest to the trailer hitch until trailer tongue jack is clear of ground.
7. Level machine using two remaining outriggers while referring to bubble level.
8. Check to be sure both wheels are clear of ground.
9. Check all outrigger lights show green and buzzer has stopped.
10. Check to be sure each outrigger foot is in firm contact with the ground.
11. Do not place boards, concrete blocks, or any other object under the outrigger foot to obtain greater height adjustment.

BOOM OPERATING

1. Remove transport stowing pins.
2. Select ground controls with key switch.
3. Press green "enable" button and operate levers as required.
4. Check all lift functions for proper operation.
5. Return all boom arms to stowed position. Move key switch to basket controls. Lift is now ready for operation from the basket.

STOWING MACHINE

1. Fully lower each boom into transport position.
2. Using outrigger levers, raise outriggers full starting at the cage end.
3. Install boom locking pins.

TOWING MACHINE

Do not tow machine unless:
* The booms are full lowered
* The boom locking pins are in place
* All outriggers are fully retracted
1. Secure trailer hitch to ball on towing vehicle.
2. Attach safety wire.
3. Attach lighting plugs. Check to make sure lighting wire cannot be damaged in transit.
4. Check to make sure lights are working properly.
5. Fully raise trailer tongue jack and release hand brake.
6. The trailer weight must not exceed the vehicle towing capacity.
7. Do not exceed maximum towing speed.

EMERGENCY LOWERING PROCEDURE

From Basket (if fitted)
In the event of power failure, the basket may be lowered using the emergency hand pump. The procedure is as follows:
1. Attach hand pump handle.
2. Select function required with control lever(s).
3. Pump hand pump.

From Ground
1. Press red emergency lowering valve on base of bottom boom lift cylinder. Stand clear of descending structure.
2. Press red emergency lowering valve on top of boom cylinder. Stand clear of descending structure.

Emergency Rotation - Install emergency rotation handle on red hex-shaft on rotation gearbox. Turn handle to rotate structure.

FTC B06-00-0399

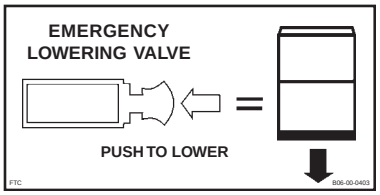
B06-00-0399

WARNING

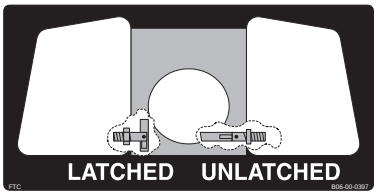
Stand clear of outrigger while it is being lowered. Contact with outrigger foot pad will cause serious crushing injury.

FTC B06-00-0404

B06-00-0404



B06-00-0403



B06-00-0397

THE HYDRAULIC SYSTEM OF THIS MACHINE IS DESIGNED TO USE ENERGOL HLP-46 HYDRAULIC OIL

OII B06-00-0068

B06-00-0068

- **Use only tools equipped with 3 prong grounded plug.**
- **1500 Watt maximum load.**
- **15 Amp maximum circuit.**

AIF/RFC B06-00-0115

B06-00-0115

BOOM OPERATING INSTRUCTIONS FOR XLB-4319

1. Read Operation Manual and all decals prior to operating.
2. Follow the instructions on the lower controls for "Unhitching", "Setting Up" and "Boom Operating". This will ensure proper boom set up and also help you familiarize yourself with the operation of the lift.
3. Check again to be sure all outriggers are properly set and the lift is level.
4. Always wear full body harness and attach lanyard to the provided attachment when operating from the basket.
5. Check the emergency stop button to make sure it is in the released position.
6. Press and hold the green enable button with one hand while operating the control levers with the other hand. Each lever is clearly marked for function and direction.

FTC B06-00-0402

B06-00-0402

B06-00-0395

B06-00-0393

STOP
READ OPERATING INSTRUCTIONS BEFORE OPERATING MACHINE
R.I.L. B06-00-0060

B06-00-0060

DANGER BEFORE USING, LOWER ALL 4 OUTRIGGERS UNTIL EACH OUTRIGGER IS IN FIRM CONTACT WITH THE GROUND, THEN LEVEL THE MACHINE.
FTC B06-00-0400

B06-00-0400

DANGER

FAILURE TO COMPLY WITH THE FOLLOWING SAFETY INSTRUCTIONS OR ANY OTHER IMPROPER USE OF THIS EQUIPMENT WILL RESULT IN SERIOUS INJURY OR DEATH.

BEFORE USE

- **Operator must read and understand owners manual and all decals on machine before operating. It is operators responsibility to comply with all warnings and instructions.**
- **Survey the job site and identify all potential hazards.**
- **Inspect lift for proper maintenance and any damaged or worn components. DO NOT operate until proper maintenance has been performed and all damaged or worn parts have been replaced. See owners manual for proper maintenance procedures.**
- **NEVER TAKE CHANCES—DO NOT use this lift if you are under the influence of drugs or alcohol, or if you feel dizzy, ill, or unsteady in any way.**
- **OPERATE ON FIRM AND LEVEL SURFACE ONLY—if used on loose gravel or other soft surfaces, additional base support under each outrigger foot pad may be necessary.**
- **Properly deploy all 4 outriggers by lowering each outrigger until it is in firm contact with the ground.**
- **Level machine before use—if buzzer sounds, lift is not level and the necessary outrigger adjustment should be made to level machine before continuing.**
- **All occupants must wear full body harness and lanyard.**
- **Check safety devices daily before use—see owners manual for proper check procedures.**
- **When working on public roads, warnings and barriers must be set up in accordance with all local, state, and federal traffic codes.**
- **Cordon off area around base to keep personnel and other equipment away from unit while in use.**

DURING USE

- **To avoid hand injuries, always keep hands inside basket area during boom movement.**
- **DO NOT use without all four outriggers in firm contact with the ground and the lift level.**
- **DO NOT release outriggers with boom extended or operator in basket.**
- **DO NOT move or reposition trailer while operator occupies basket.**
- **DO NOT use when exposed to high winds, rain, snow, or ice.**

- **DO NOT use where lift operator can come in contact with overhead obstructions such as electric wires, cables, ropes, overhangs, etc.**
- **DO NOT operate without full body harness and lanyard in use by all basket occupants.**
- **DO NOT stand or sit on guard rails or top edge of basket.**
- **DO NOT lean out over top edge of basket to perform work.**
- **DO NOT use boxes, ladders, scaffolding, or any other means to increase working height.**
- **DO NOT climb up or down boom.**
- **DO NOT exceed rated lift capacity.**
- **DO NOT allow ropes, electric cords, hoses, etc. to become entangled in the lift while platform is being raised or lowered.**
- **DO NOT override, alter, or bypass safety devices.**
- **DO NOT use boom rotation or basket rotation (if so equipped) for pushing or pulling.**
- **DO NOT exceed platform capacity when transferring loads to the platform while elevated.**
- **DO NOT use as a crane for lifting materials.**
- **DO NOT leave keys in machine while unattended.**
- **Plug charger in at the end of each day.**
- **When using the lift with the 110V power cord plugged into the base of the unit, care must be taken to ensure that the cord is not damaged or entangled during rotation.**
- **DO NOT allow flames, sparks, or embers near batteries and DO NOT smoke near batteries. Batteries produce a hydrogen, oxygen gas mixture which can explode.**

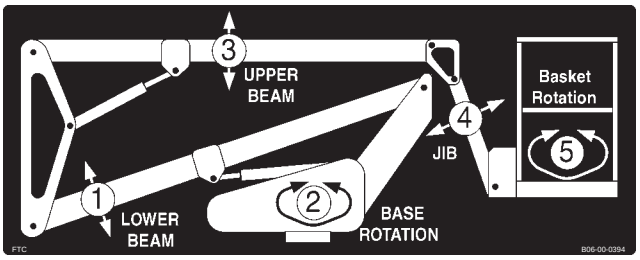
OWNERS & OPERATORS ARE RESPONSIBLE FOR INSPECTION, MAINTENANCE, TRAINING, AND OPERATION AS REQUIRED BY THE OWNERS MANUAL .

WORKFORCE® IF YOU HAVE NOT BEEN PROVIDED WITH SAFETY LITERATURE, OR FOR ANY QUESTIONS CONCERNING THE SAFE USE OF THIS EQUIPMENT, CALL 419/445-9675. B06-00-0401

FTC

B06-00-0401

Figure 5-1. Replacement Decals, Sheet 2 of 3



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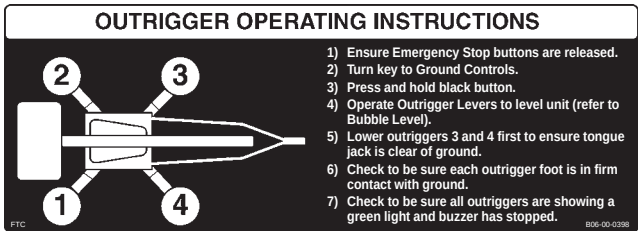

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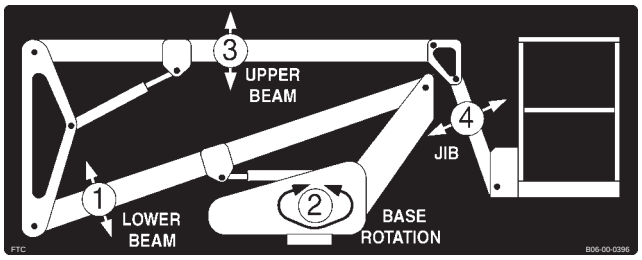

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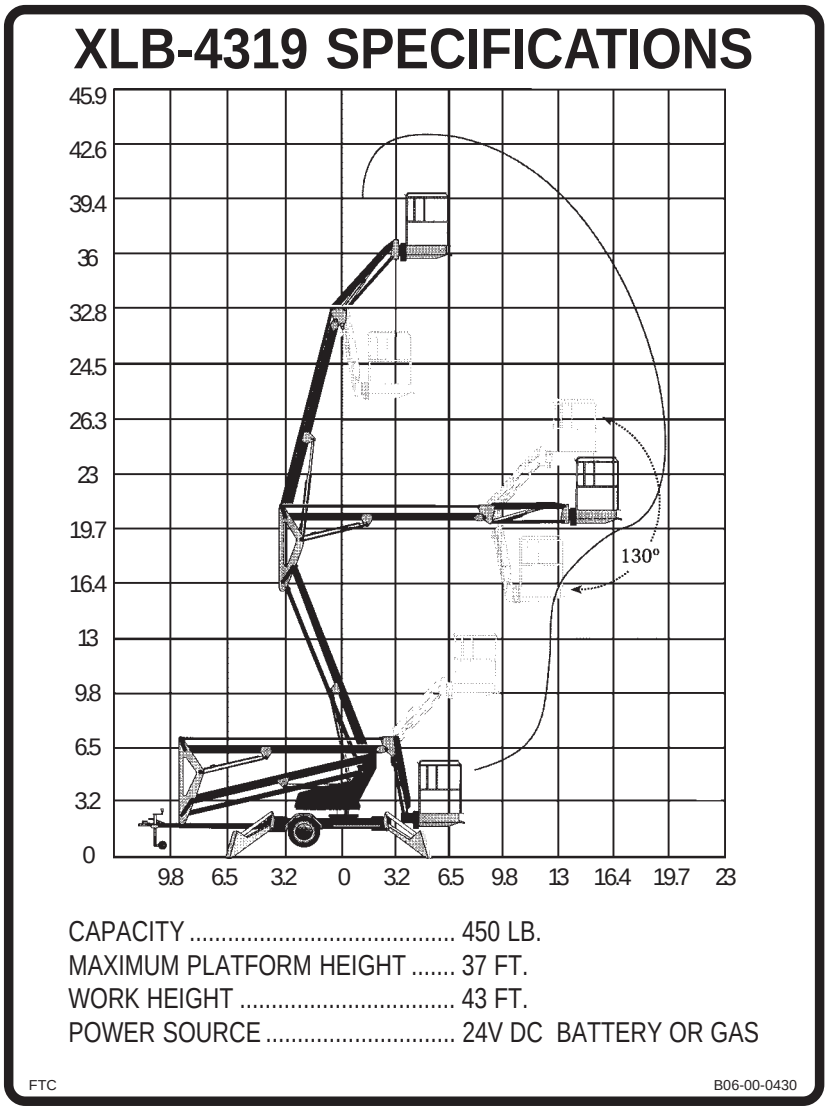


B06-00-0430

Figure 5-1. Replacement Decals, Sheet 3 of 3

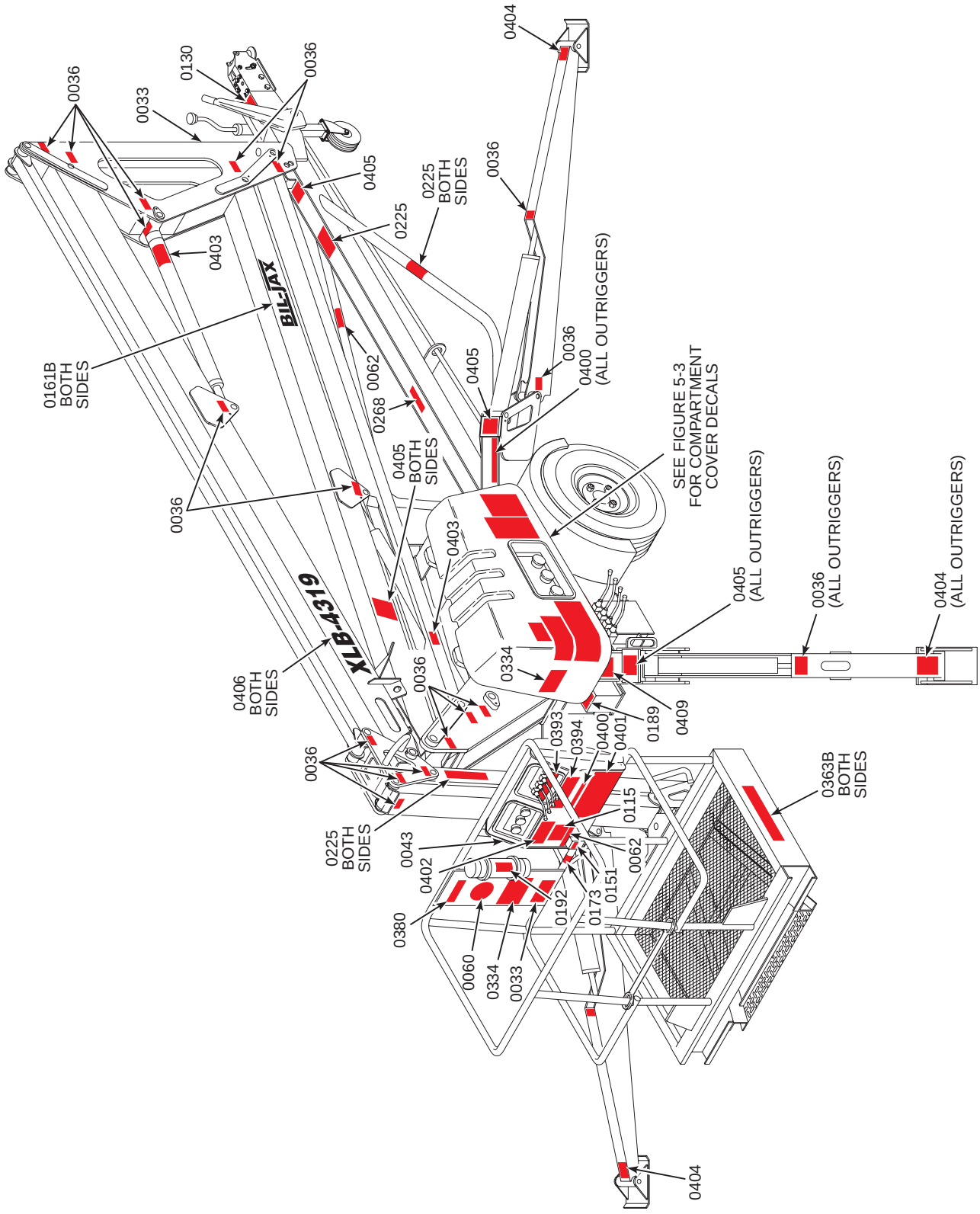


Figure 5-2. Decal Locations, Trailer and Boom

Figure 5-3. Decal Locations, Control Compartment Exterior

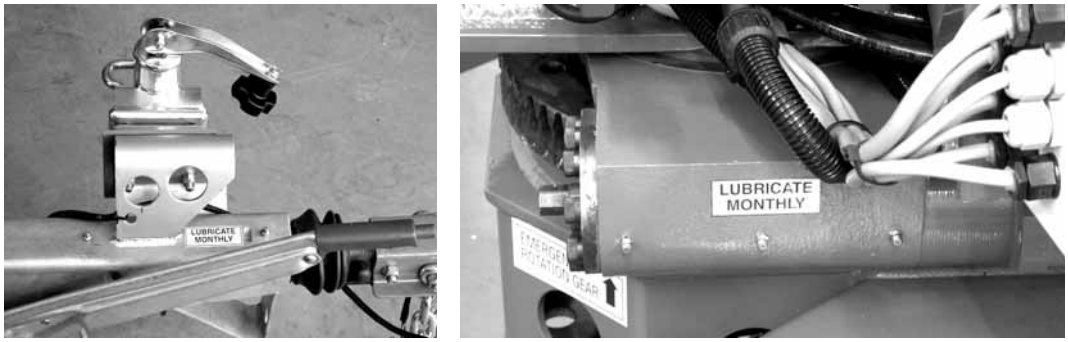


Figure 5-4. Lubricate Monthly Decal

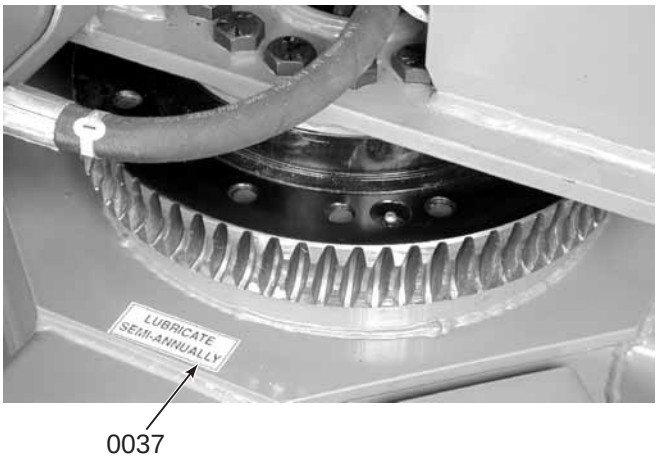


Figure 5-5. Lubricate Semi-Annually Decal

6
Parts List

6-1 UPPER BOOM PARTS LIST

Refer to Table 6-1 for the upper boom parts list.

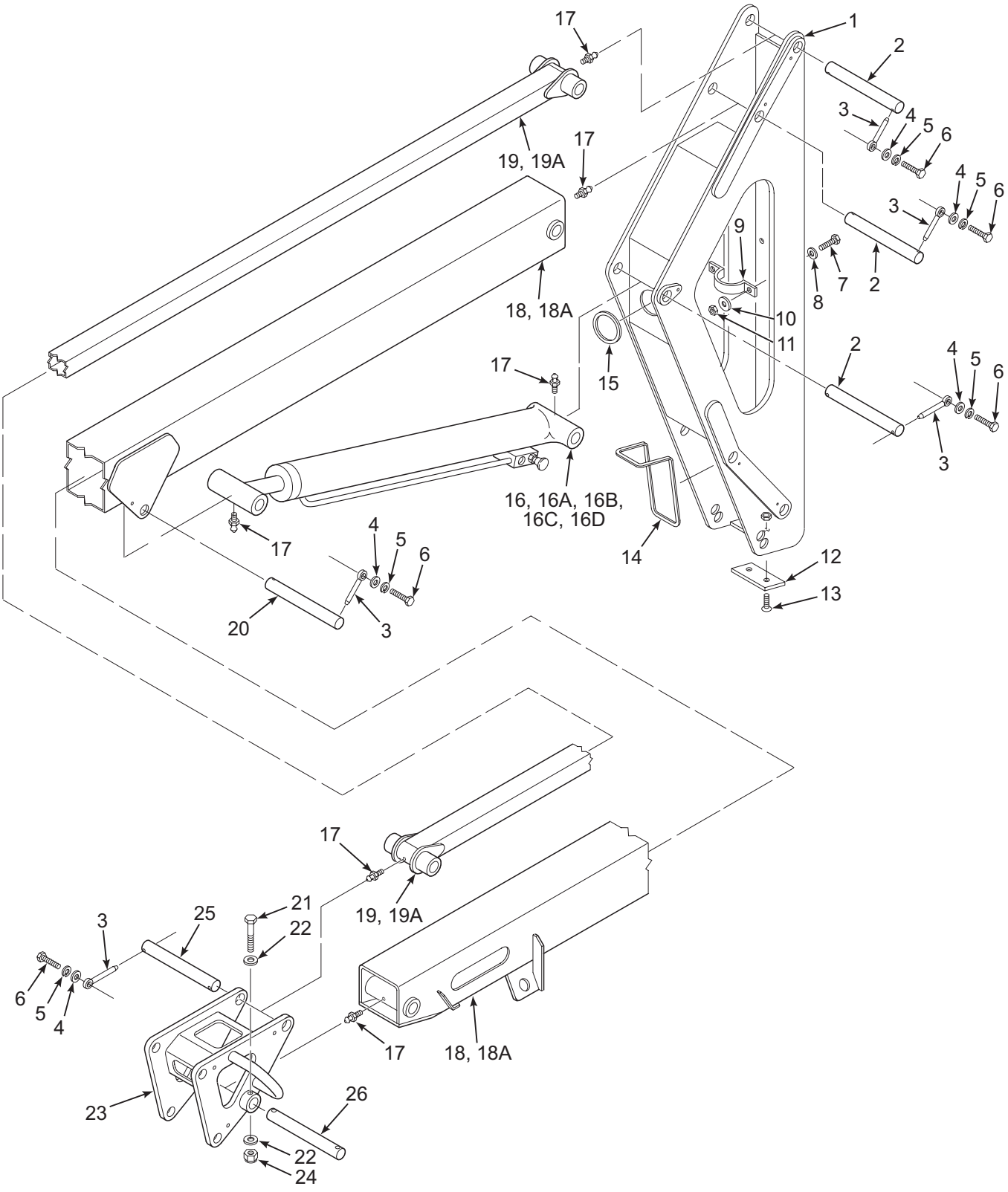


Figure 6-1. Upper Boom

Table 6-1. Upper Boom Parts List

Item No.	Part No.	Description	Qty
1	B11-03-0043	Vertical Boom	1
2	B36-00-0059	Pivot Pin, 30mm dia. x 221mm	3
3	B36-00-0042	Locking Pin	10
4		Flat Washer	10
5		Lock Washer	10
6		Cap Screw	10
7		Cap Screw	2
8		Flat Washer	2
9		Hose Clamp	1
10		Flat Washer	2
11		Hex Nut	2
12	B31-00-0036	Wear Pad	1
13		Cap Screw	2
14		Trimlock, 1/4 in. x 30 in.	1
15		Trimlock, 1/4 in. x 7 in.	1
16	B02-03-0027	Hydraulic Cylinder, Upper Boom	1
16A	B25-00-0084	Bushing, Cylinder Pivot	4
16B	B02-13-0107 B02-13-0106	Seal Kit, End Cap With Groove Seal Kit, End Cap With Groove	1
16C	B02-04-0082 B02-04-0064	Counter-Balance Valve, End Cap With Groove Counter-Balance Valve, End Cap Without Groove	1
16D	B02-14-0059 B02-14-0055	Emergency Lowering Valve, End Cap With Groove Emergency Lowering Valve, End Cap Without Groove	1
17		Grease Fitting	6
18	B11-03-0040	Upper Boom	1
18A	B25-00-0084	Bushing, Upper Boom	4
19	B11-03-0042	Upper Boom Stabilizer	1
19A	B25-00-0084	Bushing, Upper Boom Stabilizer	4
20	B36-00-0062	Pivot Pin, 30mm dia. x 179mm	1
21		Cap Screw	2
22		Flat Washer	4
23	B11-03-0045	Knuckle, Jib Boom	1
24		Self Locking Nut	2
25	B36-00-0058	Pivot Pin, 30mm dia. x 201mm	1
26	B36-00-0060	Pivot Pin, 30mm dia. x 216mm	1

6-2 LOWER BOOM PARTS LIST

Refer to Table 6-2 for the lower boom parts list.

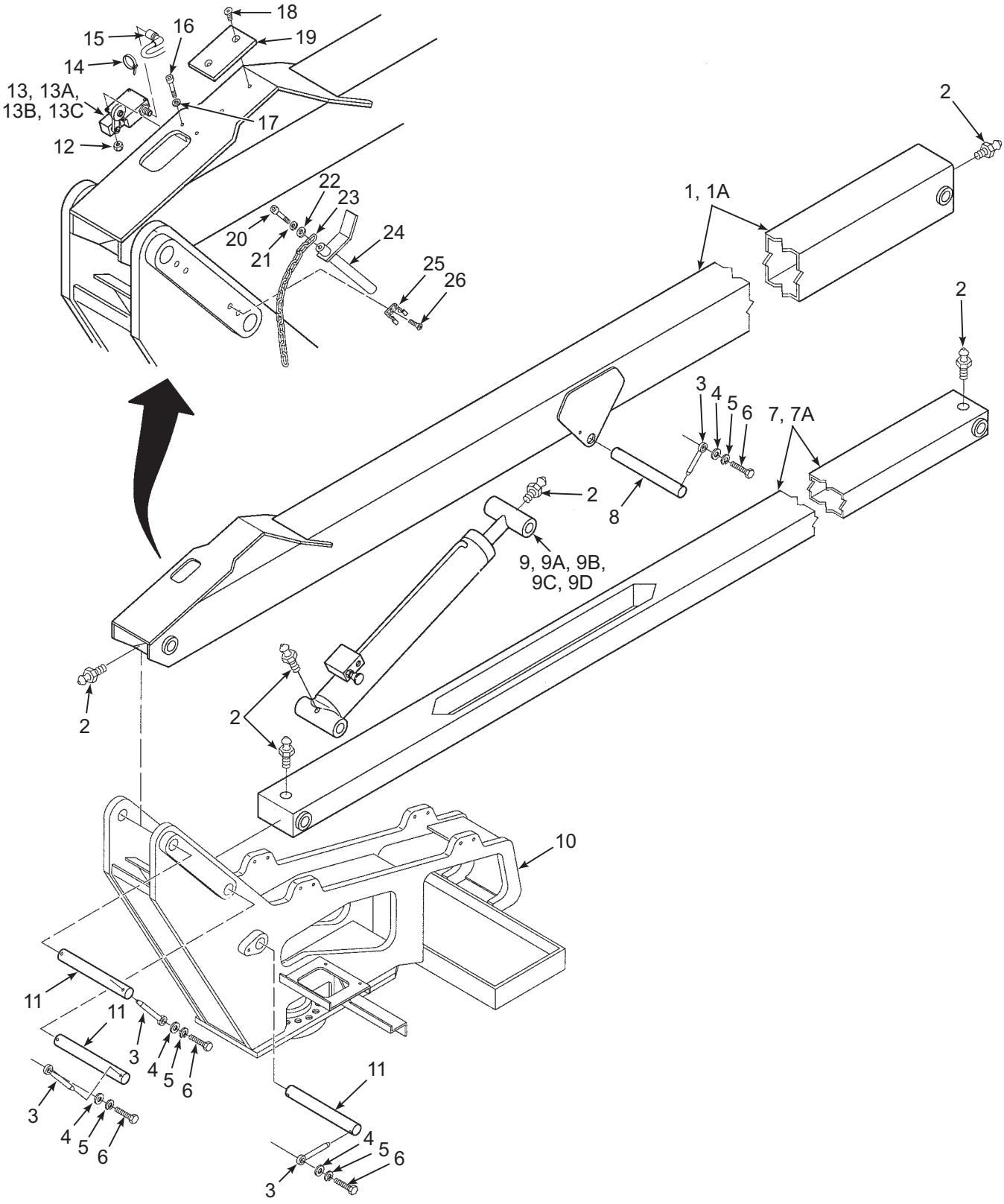


Figure 6-2. Lower Boom

Table 6-2. Lower Boom Parts List

Item No.	Part No.	Description	Qty
1	B11-03-0039	Lower Boom	1
1A	B25-00-0084	Bushing, Lower Boom	4
2		Grease Fitting	6
3	B36-00-0042	Locking Pin	8
4		Flat Washer	8
5		Lock Washer	8
6		Cap Screw	8
7	B11-03-0041	Lower Boom Stabilizer	1
7A	B25-00-0084	Bushing, Lower Boom Stabilizer	4
8	B36-00-0062	Pivot Pin, 30mm dia. x 179mm	1
9	B02-03-0028	Hydraulic Cylinder, Lower Boom	1
9A	B25-00-0084	Bushing, Cylinder Pivot	4
9B	B02-13-0107 B02-13-0106	Seal Kit, End Cap With Groove Seal Kit, End Cap With Groove	1
9C	B02-04-0082 B02-04-0064	Counter-Balance Valve, End Cap With Groove Counter-Balance Valve, End Cap Without Groove	1
9D	B02-14-0059 B02-14-0055	Emergency Lowering Valve, End Cap With Groove Emergency Lowering Valve, End Cap Without Groove	1
10		Boom Support Bracket	1
11	B36-00-0059	Pivot Pin, 30mm dia. x 221mm	3
12		Self Locking Hex Nut	4
13	B01-03-0056	Limit Switch	1
13A	B01-03-0003	Head, Limit Switch	1
13B	B01-03-0054	Roller Arm	1
13C	B01-03-0055	Plug Adapter	1
14		Wire Tie	AR
15	B01-03-0064	Cable, Limit Switch	1
16		Socket Head Screw	4
17		Flat Washer	4
18		Flat Head Screw, M8 x 1.25 x 20mm	2
19	B31-00-0037	Boom Wear Pad	1
20		Socket Head Screw	1
21		Lock Washer	1
22		Flat Washer	1
23		Chain	1
24	B36-00-0040	Transport Pin	1
25		Clamp	1
26		Flat Head Screw	1

6-3 JIB BOOM PARTS LIST

Refer to Table 6-3 for the jib boom parts list.

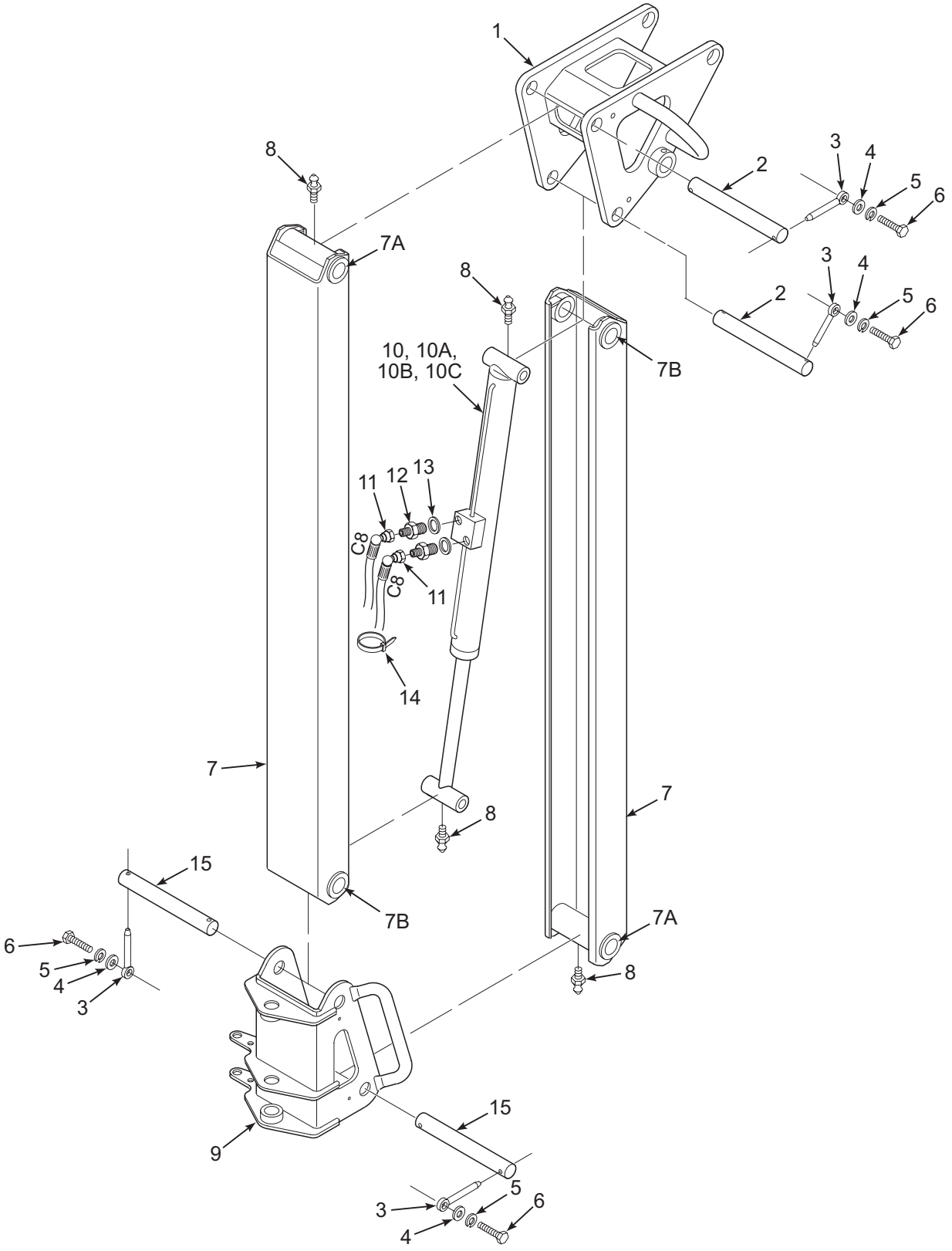


Figure 6-3. Jib Boom

Table 6-3. Jib Boom Parts List

Item No.	Part No.	Description	Qty
1	B11-03-0045	Jib Boom Knuckle	1
2	B36-00-0067	Pivot Pin, 25mm dia. x 208mm	2
3	B36-00-0042	Locking Pin	8
4		Flat Washer	8
5		Lock Washer	8
6		Cap Screw	8
7	B11-03-0044	Jib Boom	2
7A	B25-00-0081	Bushing, Jib Boom, Full Boss	2
7B	B25-00-0086	Bushing, Jib Boom, Short Boss	4
8		Grease Fitting	4
9	B11-03-0046	Cage Support	1
10	B02-03-0029	Hydraulic Cylinder, Jib Boom	1
10A	B25-00-0081	Bushing, Cylinder Pivot	4
10B	B02-13-0107 B02-13-0106	Seal Kit, End Cap With Groove Seal Kit, End Cap Without Groove	1
10C	B02-04-0082 B02-04-0064	Counter-Balance Valve, End Cap With Groove Counter-Balance Valve, End Cap Without Groove	2
11	B02-01-0168	Hydraulic Hose Assembly, 6mm, C8	2
12	B02-02-0210	Adapter, Straight, 1/4 BSP Male-1/4 BSP Male	2
13	B02-00-0044	1/4 Dowty Washer	2
14		Wire Tie	AR
15	B36-00-0066	Pivot Pin, 25mm dia. x 201mm	2

6-4 COMPARTMENT COVERS PARTS LIST

Refer to Table 6-4 for the control and power compartment covers parts list.

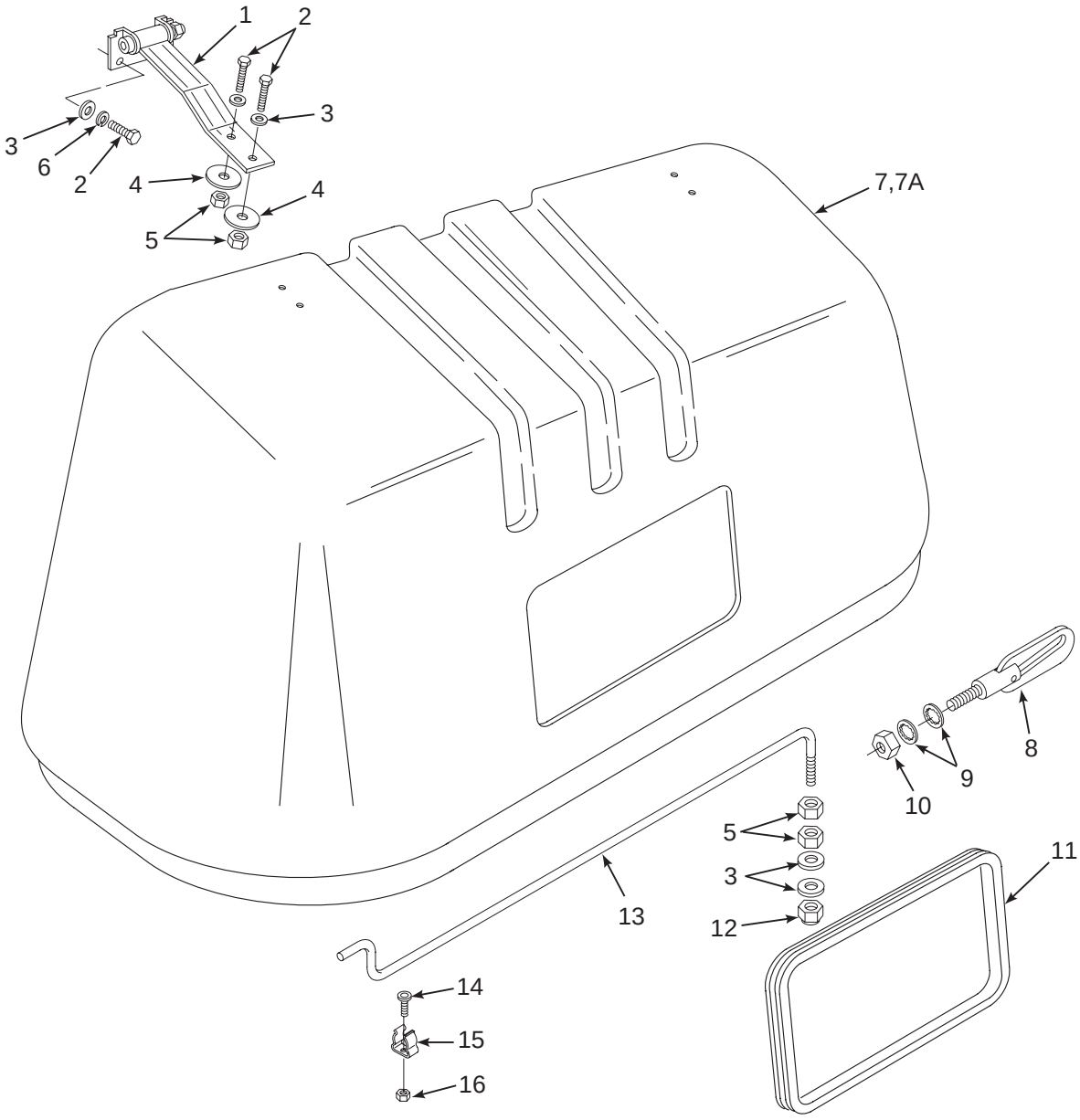


Figure 6-4. Compartment Covers

Table 6-4. Compartment Covers Parts List

Item No.	Part No.	Description	Qty
1	B42-01-1015	Hinge, Cover	2
2		Cap Screw	8
3		Flat Washer	10
4		Fender Washer	4
5		Hex Nut	6
6		Lock Washer	4
7	B18-00-0156	Cover, Control Compartment	1
7A	B18-00-0155	Cover, Pump Compartment (not shown)	1
8	B04-07-0121	Latch, Cover	1
9		Washer, Internal Lock	2
10		Hex Nut	1
11		Trimlock, 1/4 in. x 30.5 in.	1
12		Hex Nut, Self Locking	1
13	B42-00-0020	Support Rod	1
14		Socket Head Screw, Flat Head	1
15	B04-07-0118	Clamp, Support Rod	1
16		Hex Nut, Self Locking	1

NOTE: Quantities shown are for one cover. There are two covers on the machine, control compartment and pump compartment. The pump compartment does not have an opening and does not require a trim lock, item 11.

6-5 RESERVOIR COMPARTMENT PARTS LIST, GAS MODEL

Refer to Table 6-5 for the pump compartment parts list for the gas model boom lift.

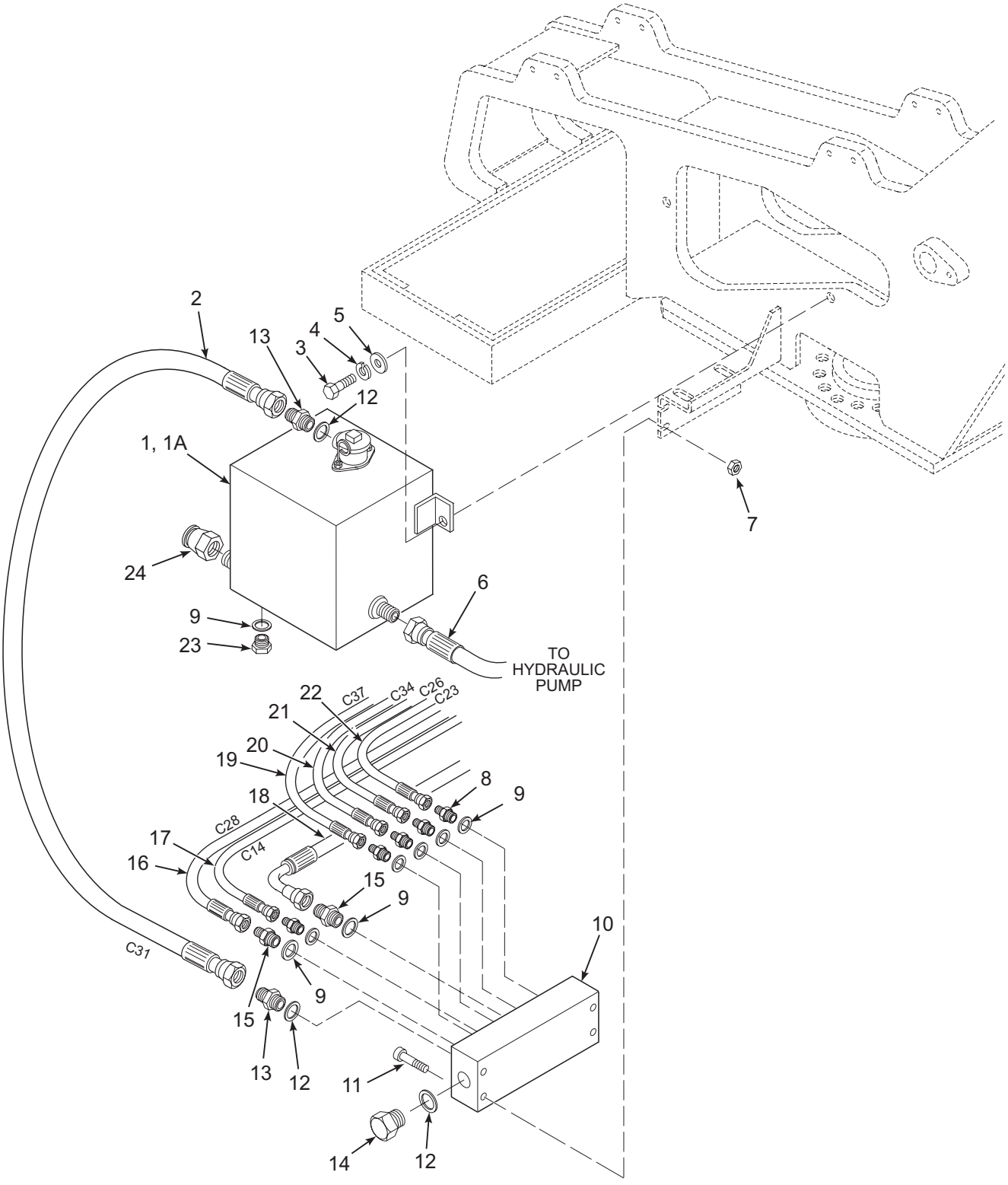


Figure 6-5. Reservoir Compartment, Gas Model

Table 6-5. Reservoir Compartment Parts List, Gas Model

Item No.	Part No.	Description	Qty
1		Reservoir Assembly	1
1A		Hydraulic Filter (not shown)	1
2	B02-01-0185	Hydraulic Hose Assembly, 13mm, C31	1
3		Cap Screw	2
4		Lock Washer	2
5		Flat Washer	2
6		Hydraulic Hose Assembly, Pump Supply	1
7		Hex Nut, Self Locking	2
8	B02-02-0205	Adapter, Straight, 1/4 BSP Male-3/8 BSP Male	5
9	B02-00-0043	3/8 Dowty Washer	8
10		Return Manifold Assembly	1
11		Socket Head Cap Screw	2
12	B02-00-0042	1/2 Dowty Washer	4
13	B02-02-0218	Adapter, Straight, 3/8 BSP Male-1/2 BSP Male	2
14	B02-02-0220	1/2 BSP Male Plug	2
15	B02-02-0206	Adapter, Straight, 3/8 BSP Male-3/8 BSP Male	2
16	B02-01-0183	Hydraulic Hose Assembly, 10 mm, C28	1
17	B02-01-0173	Hydraulic Hose Assembly, 6 mm, C14	1
18	B02-01-0156	Hydraulic Hose Assembly, 10 mm, C1	1
19		Hydraulic Hose Assembly, 6 mm, C37	1
20		Hydraulic Hose Assembly, 6 mm, C34	1
21	B02-01-0163	Hydraulic Hose Assembly, 6 mm, C26	1
22	B02-01-0182	Hydraulic Hose Assembly, 6 mm, C23	1
23	B02-02-0215	3/8 BSP Male Plug	1
24		Cap	1

6-6 PUMP COMPARTMENT PARTS LIST, DC MODEL

Refer to Table 6-6 for the pump compartment parts list for the DC model boom lift.

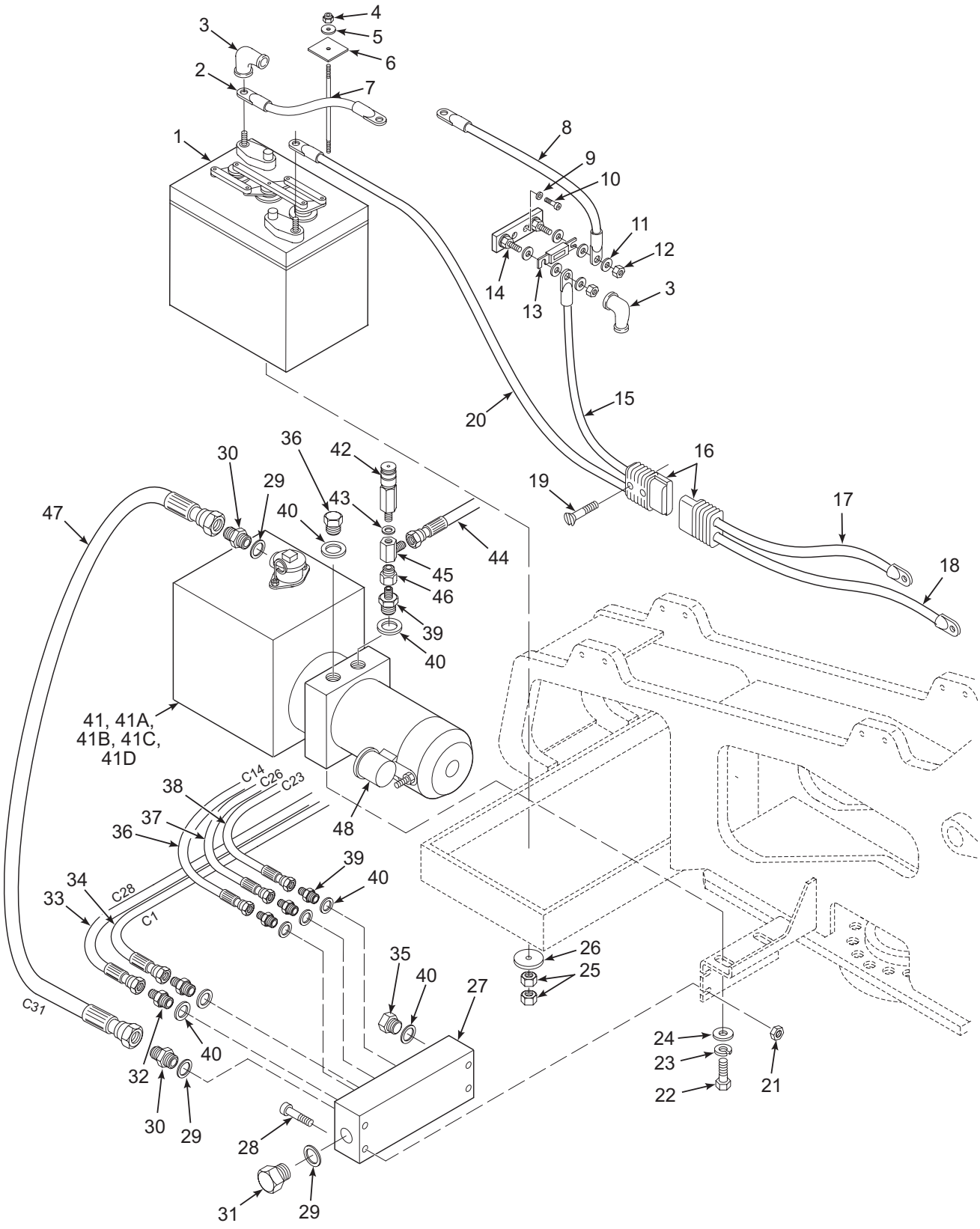


Figure 6-6. Pump Compartment, DC Model

Table 6-6. Pump Compartment Parts List, DC Model

Item No.	Part No.	Description	Qty
1	B01-04-0001	Battery, Dry Cell, 6 Volt DC	4
2		Cable, Battery, 2 Ga. x 8 in.	3
3		Terminal Boot	12
4	0090-0185	Hex Nut, Self Locking, 5/16 in.-18	2
5	0090-0420	Flat Washer, 5/16 in.	2
6	0090-0787	Fender Washer	2
7	B04-07-0081	Threaded Rod, 5/16 in. x 10 in.	2
8		Cable, Battery, 2 Ga. x 12 in.	1
9		Flat Washer	2
10		Socket Head Cap Screw	2
11		Flat Washer	6
12		Flange Nut	2
13	B01-10-0245	Fuse, 200 Amp, FS2	1
14	B01-10-0246	Insulator	1
15		Cable, Battery, 2 Ga. x 21 in.	1
16		Cable Connector, Plug and Receptacle	1
17		Cable, Battery, 2 Ga. x 12 in.	1
18		Cable, Battery, 2 Ga. x 14 in.	1
19		Machine Screw, Flat Head	2
20		Cable, Battery, 2 Ga. x 38 in.	1
21		Hex Nut, Self Locking	2
22		Cap Screw	2
23		Lock Washer	2
24		Flat Washer	2
25		Hex Nut	4
26		Fender Washer	2
27		Hydraulic Return Manifold	1
28		Socket Head Cap Screw	2
29	B02-00-0042	1/2 Dowty Washer	4
30	B02-02-0218	Adapter, Straight, 3/8 BSP Male-1/2 BSP Male	2
31	B02-02-0220	1/2 BSP Male Plug	2
32	B02-02-0206	Adapter, Straight, 3/8 BSP Male-3/8 BSP Male	2
33	B02-01-0183	Hydraulic Hose Assembly, 10 mm, C28	1
34	B02-01-0156	Hydraulic Hose Assembly, 10 mm, C1	1
35	B02-02-0215	3/8 BSP Male Plug	3

6-6 PUMP COMPARTMENT PARTS LIST, DC MODEL

Refer to Table 6-6 for the pump compartment parts list for the DC model boom lift.

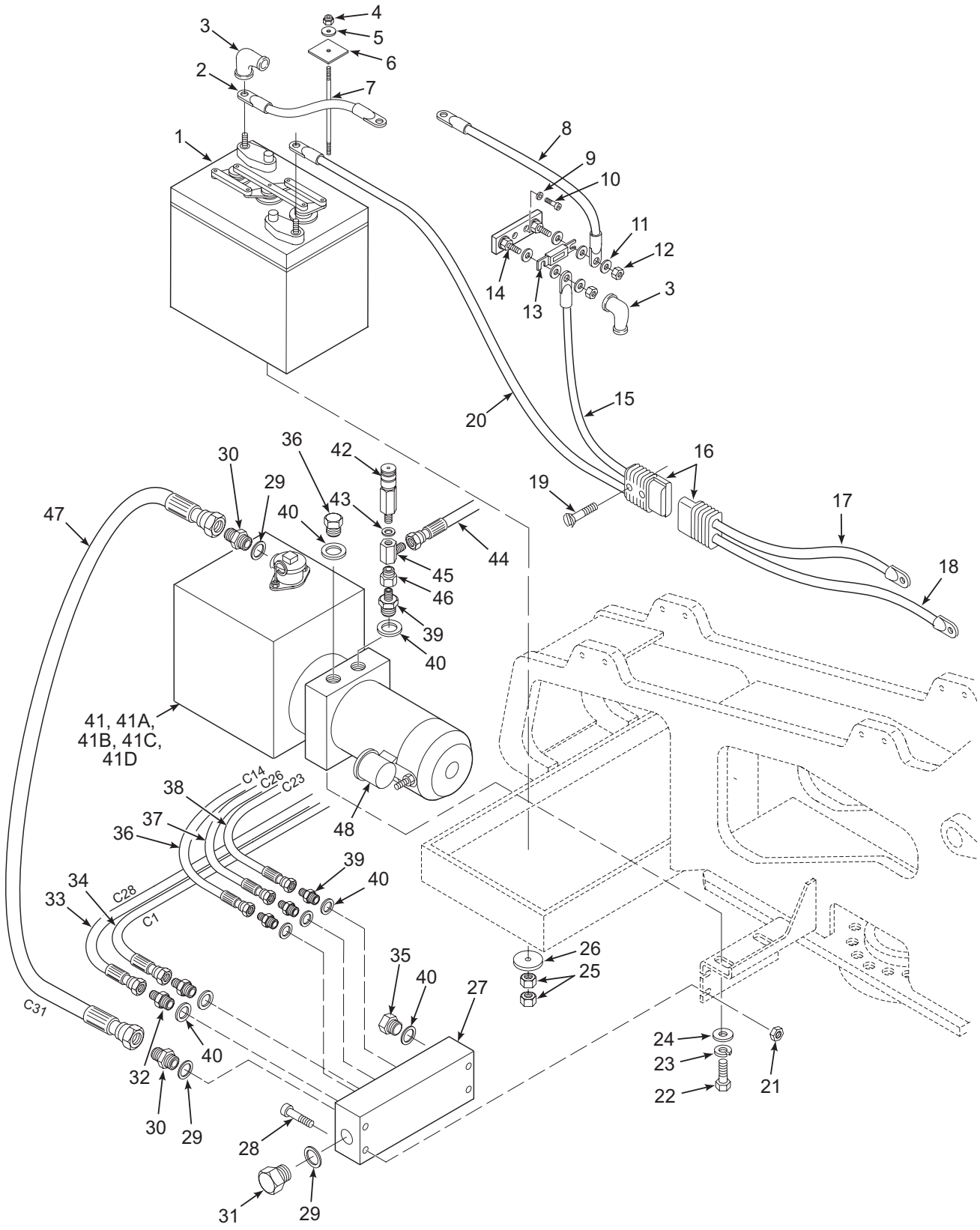


Figure 6-6. Pump Compartment, DC Model

Table 6-6. Pump Compartment Parts List, DC Model (continued)

Item No.	Part No.	Description	Qty
36	B02-01-0173	Hydraulic Hose Assembly, 6 mm, C14	1
37	B02-01-0163	Hydraulic Hose Assembly, 6 mm, C26	1
38	B02-01-0182	Hydraulic Hose Assembly, 6 mm, C23	1
39	B02-02-0205	Adapter, Straight, 1/4 BSP Male-3/8 BSP Male	4
40	B02-00-0043	3/8 Dowty Washer	9
41		Pump and Reservoir Assembly	1
41A	B02-15-0419	Pump Assembly Without Reservoir	1
41B		Hydraulic Filter (not shown)	1
41C	B02-15-0389	Motor, 24V	1
41D	B02-15-0390	Brush Kit, 24V Motor	1
42	B02-02-0216	Fitting, Test Gauge	1
43	B02-00-0043	1/4 Dowty Washer	1
44		Hydraulic Hose Assembly, Pump Output	1
45	B02-02-0214	Fitting, Tee, 1/4 BSP Male	1
46	B02-02-0213	Adapter, Straight, 1/4 BSP Female Swivel-3/8 BSP Male	1
47	B02-01-0185	Hydraulic Hose Assembly, 13mm, C31	1
48		Start Contact, 24V	1

6-7 CHASSIS AND ROTATION UNIT PARTS LIST

Refer to Table 6-7 for the chassis and rotation unit parts list.

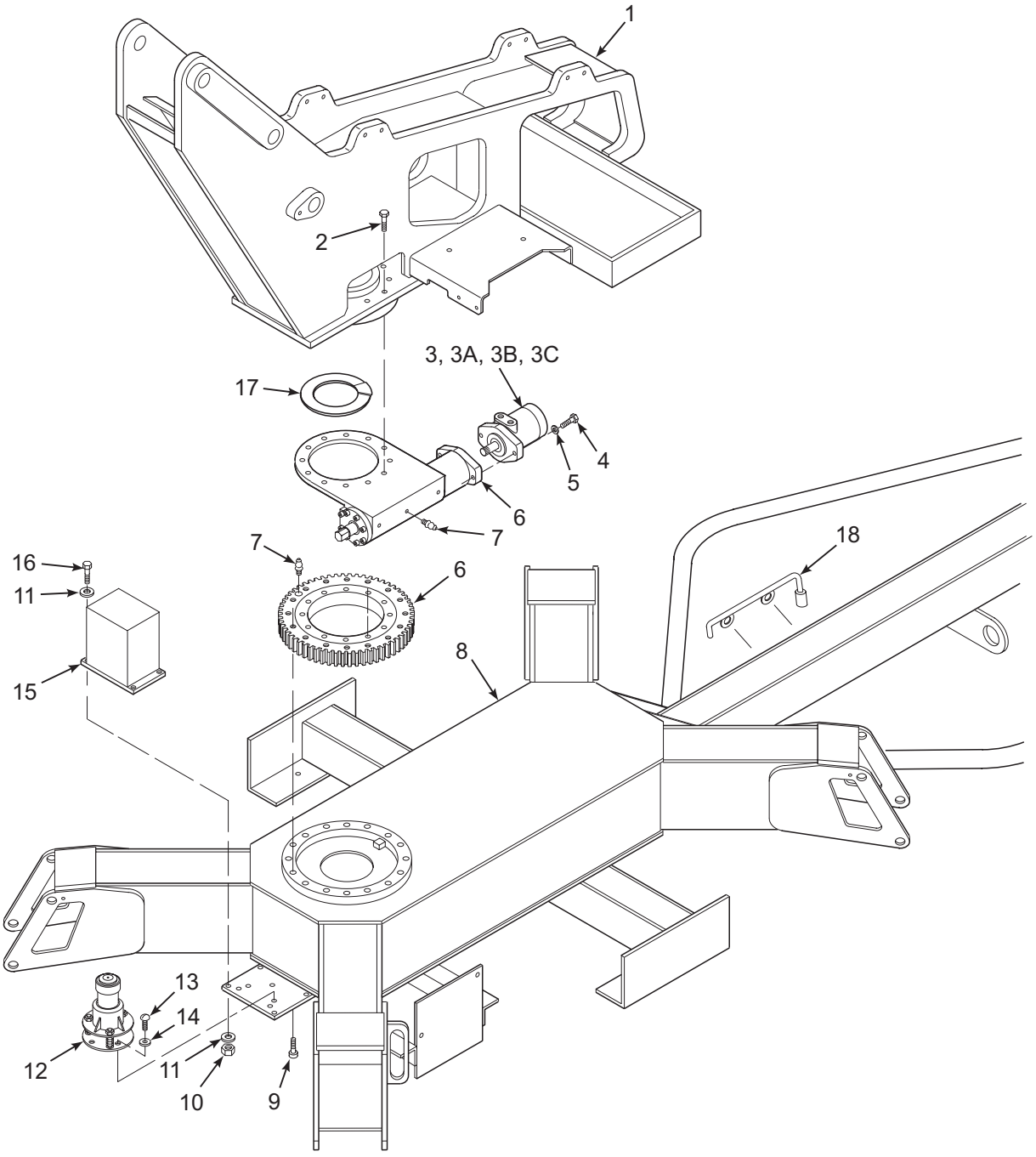


Figure 6-7. Chassis and Rotation Unit

Table 6-7. Chassis and Rotation Unit Parts List

Item No.	Part No.	Description	Qty
1		Boom Support Bracket	1
2		Cap Screw	12
3	B02-06-0009	Slew Motor	1
3A	B02-06-0010	Seal Kit, Slew Motor	1
3B	B02-06-0011	Slew Motor End Seal	1
3C	B25-00-0078	Taper Roller Bearing	2
4		Cap Screw	2
5		Lock Washer	2
6	B13-00-0007	Worm Gearbox With Slew Ring	1
7		Grease Fitting	4
8	B12-00-0140	Trailer Chassis	1
9		Socket Head Screw	16
10		Hex Nut	4
11		Flat Washer	8
12	B01-10-0016	Level Sensor	1
13		Machine Screw	3
14		Lock Washer	3
15		Level Sensor Cover	1
16		Machine Screw	4
17	B11-03-0047	Slew Restrictor	1
18	B46-00-0035	Handle, Manual Rotation	1

6-8 HITCH AND JACK ASSEMBLY PARTS LIST

Refer to Table 6-8 for the hitch and jack assembly parts list.

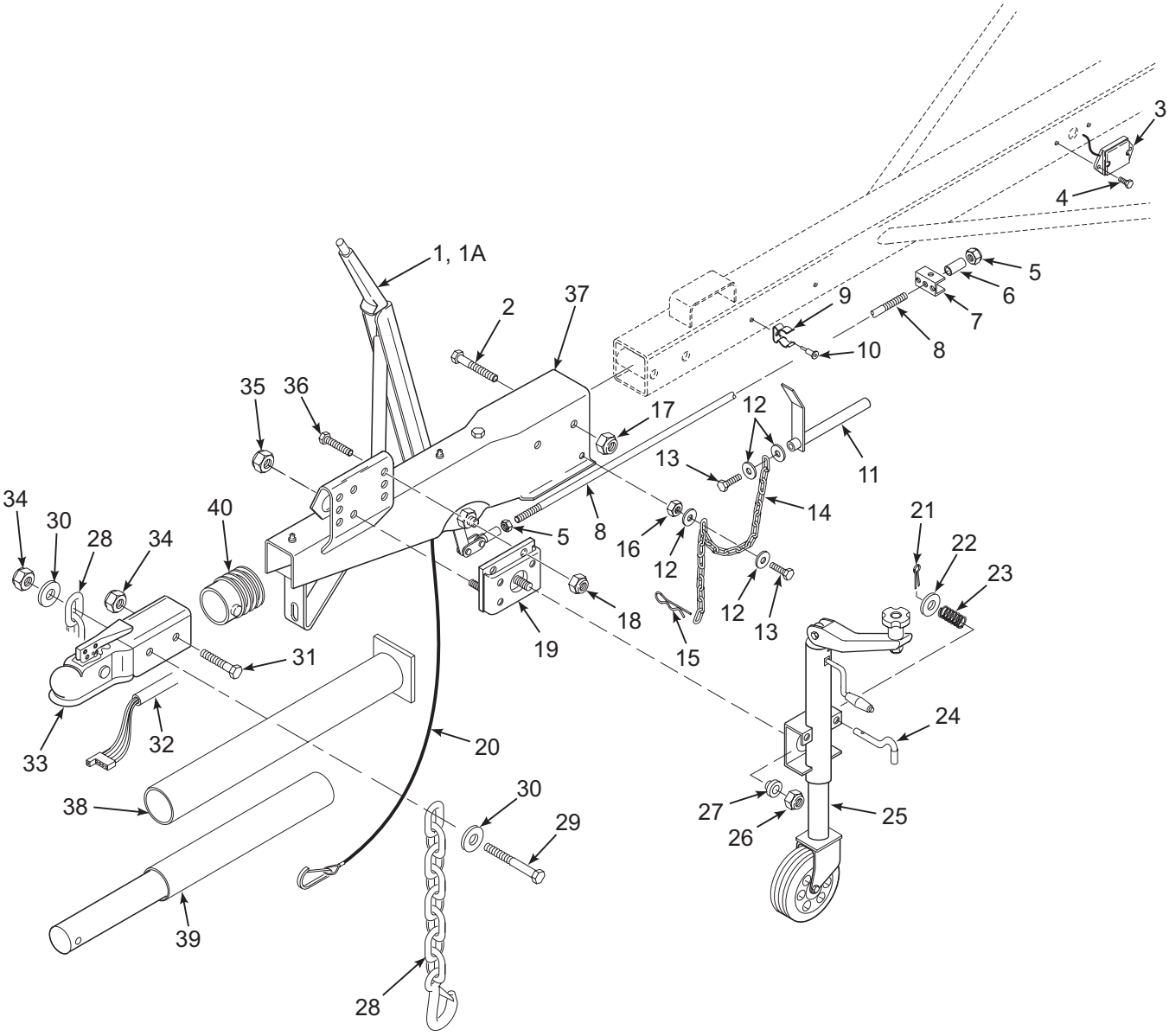


Figure 6-8. Hitch and Jack Assembly

Table 6-8. Hitch and Jack Assembly Parts List

Item No.	Part No.	Description	Qty
1	B12-00-0122	Parking/Surge Brake Control Assembly	1
1A	B12-00-0123	Hand Brake Only	1
2		Cap Screw	2
3	B01-10-0179	Lamp, Side Marker, Amber	2
4	0090-0344	Screw, Self Tapping, #10-24 x 1/2"	4
5		Hex Nut, Self Locking	2
6		Spacer	1
7		Bracket, Brake Cable	1
8	B12-00-0125	Brake Rod	1
9		Clamp	2
10		Socket Head Screw, Flat Head	2
11	B36-00-0040	Transport Pin	1
12		Flat Washer	2
13		Cap Screw	1
14		Chain	1
15		Keeper pin	1
16		Hex Nut	1
17		Hex Nut, Self Locking	2
18	0090-0188	Hex Nut, Self Locking, 3/8”-16	2
19	B23-02-0063	Swivel Plate	1
20	B12-00-0173	Breakaway Safety Cable	1
21		Cotter Key	1
22		Flat Washer	1
23		Spring	1
24		Swivel Pin	1
25	B23-02-0061	Jack Assembly	1
26		Hex Nut, Self Locking	1
27		Bushing	1
28	B03-00-0017	Safety Chain	2
29	0090-0959	Cap Screw, M12 x 1.75 x 100mm	1
30		Flat Washer	2
31	0090-1032	Cap Screw, M12 x 1.75 x 80mm	1
32	B01-01-0137	Wiring Harness	1
33	B12-00-0120	Ball Hitch	1
34	0090-0960	Hex Nut, Self Locking, M12 x 1.75	2
35		Hex Nut, Self Locking	2
36	0090-0042	Cap Screw, 3/8”-16 x 1”	2
37	B12-00-0172	Housing, Coupler With Bearings	1
38	B12-00-0171	Overrun Shaft	1
39	B12-00-0124	Damper, Gas Shock	1
40	B12-00-0135	Rubber Boot, Hitch	1

6-9 AXLE AND WHEEL ASSEMBLY PARTS LIST

Refer to Table 6-9 for the axle and wheel assembly parts list.

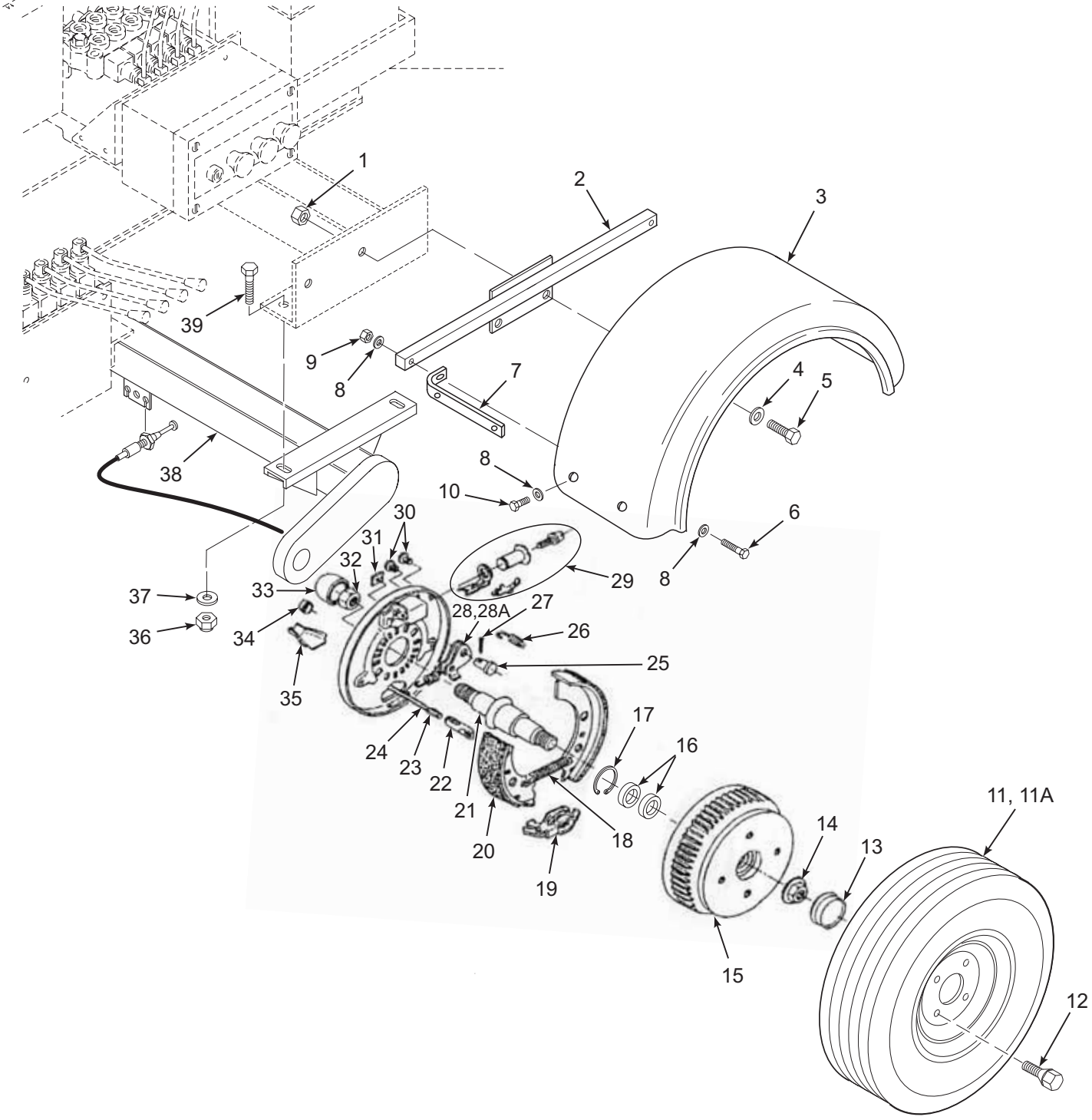


Figure 6-9. Axle and Wheel Assembly

Table 6-9. Axle and Wheel Assembly Parts List

Item No.	Part No.	Description	Qty
1		Hex Nut, Self Locking	4
*	B22-00-0026	Kit, Fender (includes items 2, 3, & 6-10)	2
2	B29-00-0154	Bracket, Fender	2
3	B18-00-0109	Fender, Top Mount	2
4		Flat Washer	4
5		Cap Screw	4
6	0090-0033	Cap Screw, 5/16”-18 x 1-3/4”	4
7	B07-06-5772	Fender Mount	4
8	0090-0420	Flat Washer, 5/16”	16
9	0090-0185	Nut, Lock, 5/16”-18	4
10	0090-0645	Cap Screw, 5/16”-18 x 1/2”	8
11	B08-02-0012	Tire	2
11A	B08-02-0013	Rim Only	2
12	B10-00-0062	Bolt, Wheel Lug, Conical, M12 x 1.5	8
13	B10-00-0063	Dust Cap	2
14	B10-00-0061	Flange Nut, Spindle	2
15	B21-00-0025 B21-00-0025B	Brake Drum with Bearings, Nut Mount Spindle Brake Drum with Bearings, Bolt Mount Spindle	2
16	B25-00-0077 B25-00-0077B	Wheel Bearing, Nut Mount Spindle Wheel Bearing, Bolt Mount Spindle	4
17	B10-00-0083 B10-00-0083B	Retaining Ring, Nut Mount Spindle Retaining Ring, Bolt Mount Spindle	2
18	B10-00-0077	Pull-off Spring	2
19	B10-00-0078	Expanding Clutch	2
20	B21-00-0024	Brake Shoe (pair)	2
21	B10-00-0079 B10-00-0079B	Spindle, Nut Mount Spindle, Bolt Mount	2
22	B10-00-0080	Cable Eye	2
23	B12-00-0126	Brake Cable	2
24	B10-00-0081	Spring, Reverse Lever	2
25	B10-00-0076	Bearing Bolt	2
26	B10-00-0075	Spring, Shoe Retaining	2
27	B10-00-0074	Cotter Pin	2
28	B10-00-0072	Reverse Lever LH Side	1
28A	B10-00-0073	Reverse Lever RH Side	1
29	B10-00-0065	Brake Adjuster Assembly	2
30	B10-00-0071	Plug, Plastic	4
31	B10-00-0070	Cover Plate	2
32	B10-00-0069 B10-00-0082	Lock Nut, Nut Mount Spindle Bolt, M20 x 60mm, Bolt Mount Spindle (not shown)	2
33	B10-00-0068	Cover, Spindle Lock Nut, Nut Mount Spindle Only	2
34	B10-00-0067	Backplate Cap	2
35	B10-00-0066	Brake Cable Shell	2
36		Hex Nut, Self Locking	4
37		Flat Washer	4
38	B10-00-0064	Axle Assembly	1
39		Cap Screw	4

* Order fender kit B22-00-0026 when replacing original side mounted fender.

6-10 REAR LIGHTS AND JUNCTION BOX PARTS LIST

Refer to Table 6-10 for the rear lights and junction box parts list.

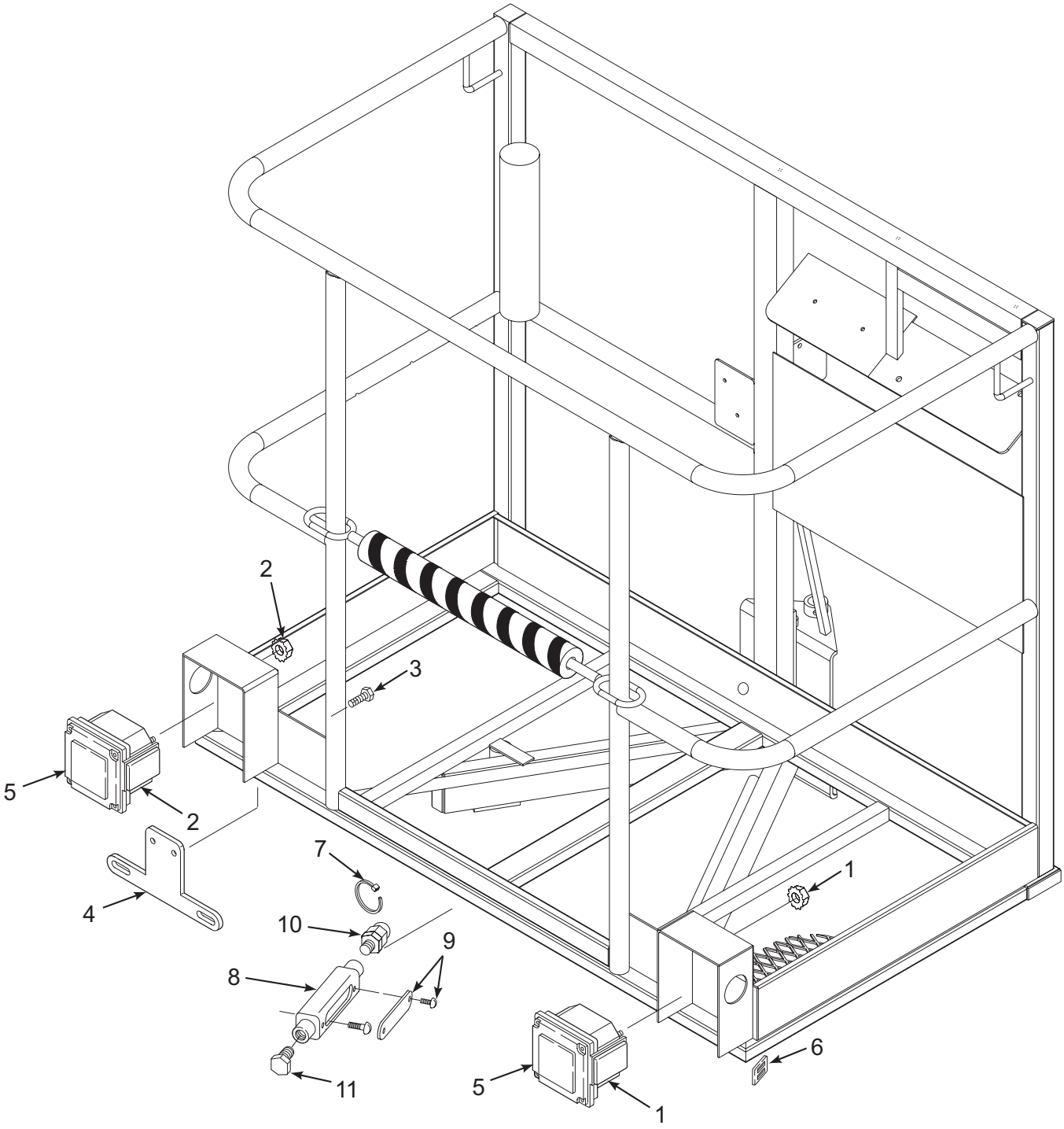


Figure 6-10. Rear Lights and Junction Box

Table 6-10. Rear Lights and Junction Box Parts List

Item No.	Part No.	Description	Qty
1	B01-10-0023	Tail Light Assembly, Right	1
2	B01-10-0024	Tail Light Assembly, Left	1
3	0090-0934	Screw, Self Tapping, 1/4"-20 x 3/4"	2
4	B29-00-0037	Bracket, License Plate	1
5	B01-10-0069	Lens, Replacement	2
6	B01-09-0023	Anchor Plate, Wire Tie	3
7	B01-09-0030	Wire Tie, 3/32” x 6 1/4"	3
8	B01-10-0014	Junction Box	1
9	B01-10-0049	Cover, Junction Box	1
10	B01-09-0029	Cord Grip	1
11	B01-09-0010	Cord Cap	1

6-11 OUTRIGGERS PARTS LIST

Refer to Table 6-11 for the outriggers parts list.

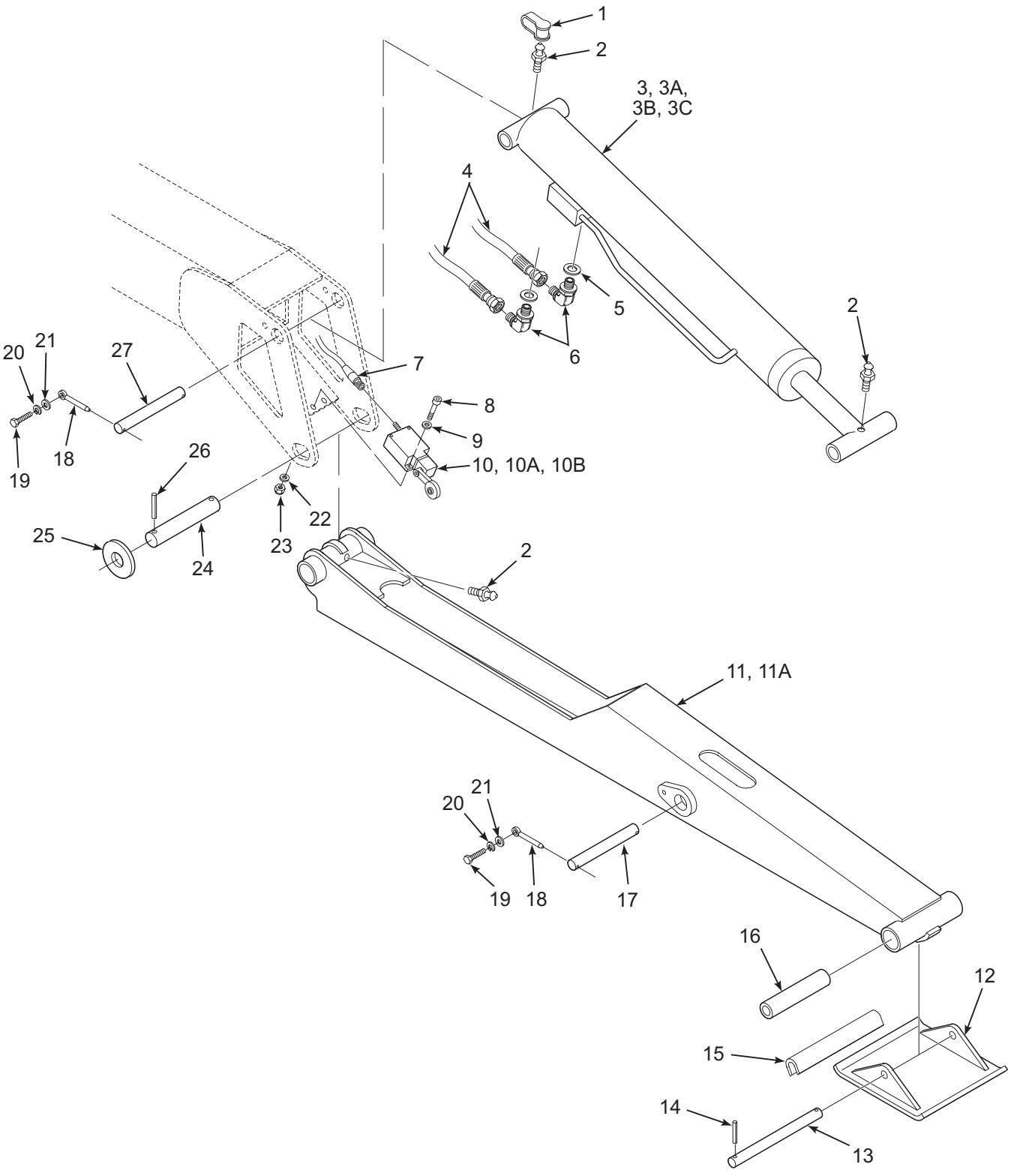


Figure 6-11. Outriggers

Table 6-11. Outriggers Parts List

Item No.	Part No.	Description	Qty
1		Dust Shield	1
2		Grease Fitting	2
3	B02-03-0026	Hydraulic Cylinder, Outrigger	1
3A	B25-00-0084	Bushing, Cylinder Pivot	4
3B	B02-13-0109	Seal Kit, Outrigger	1
3C	B02-14-0060	Check Valve, Outrigger	2
4	B02-01-0174 B02-01-0175 B02-01-0176 B02-01-0177	Hydraulic Hose Assembly, 6 mm, C15 Hydraulic Hose Assembly, 6 mm, C16 Hydraulic Hose Assembly, 6 mm, C17 Hydraulic Hose Assembly, 6 mm, C18	2
5	B02-00-0044	1/4 Dowty Washer	2
6	B02-02-0203	Adapter, 90°, 1/4 BSP Male-1/4 BSP Male	2
7	B01-03-0059	Cable, Limit Switch	1
8		Socket Head Cap Screw	4
9		Flat Washer	4
10	B01-03-0051	Limit Switch, Body With 2 NC Contacts	1
10A	B01-03-0003	Head, Limit Switch	1
10B	B01-03-0057	Contact Only, 2 NC	1
11	B23-01-0099	Outrigger	1
11A	B25-00-0084	Bushing, Outrigger	2
12	B23-02-0064	Outrigger Footpad	1
13	B23-02-0065	Hinge Pin, 16mm dia. x 102mm	1
14		Split Pin, 0.19 in. dia. x 1 in.	2
15		Trimlock	7 in.
16		Sleeve, Hinge Pin	1
17	B36-00-0057	Pivot Pin, 30mm dia. x 167mm	1
18	B36-00-0042	Locking Pin	4
19		Cap Screw	4
20		Lock Washer	4
21		Flat Washer	4
22		Flat Washer	4
23		Hex Nut, Self Locking	4
24	B36-00-0055	Pivot Pin, 30mm dia. x 211mm	1
25		Flat Washer	2
26		Split Pin, 0.25 in. dia. x 2 in.	2
27	B36-00-0058	Pivot Pin, 30mm dia. x 201mm	1

6-12 BASKET PARTS LIST

Refer to Table 6-12 for the basket parts list.

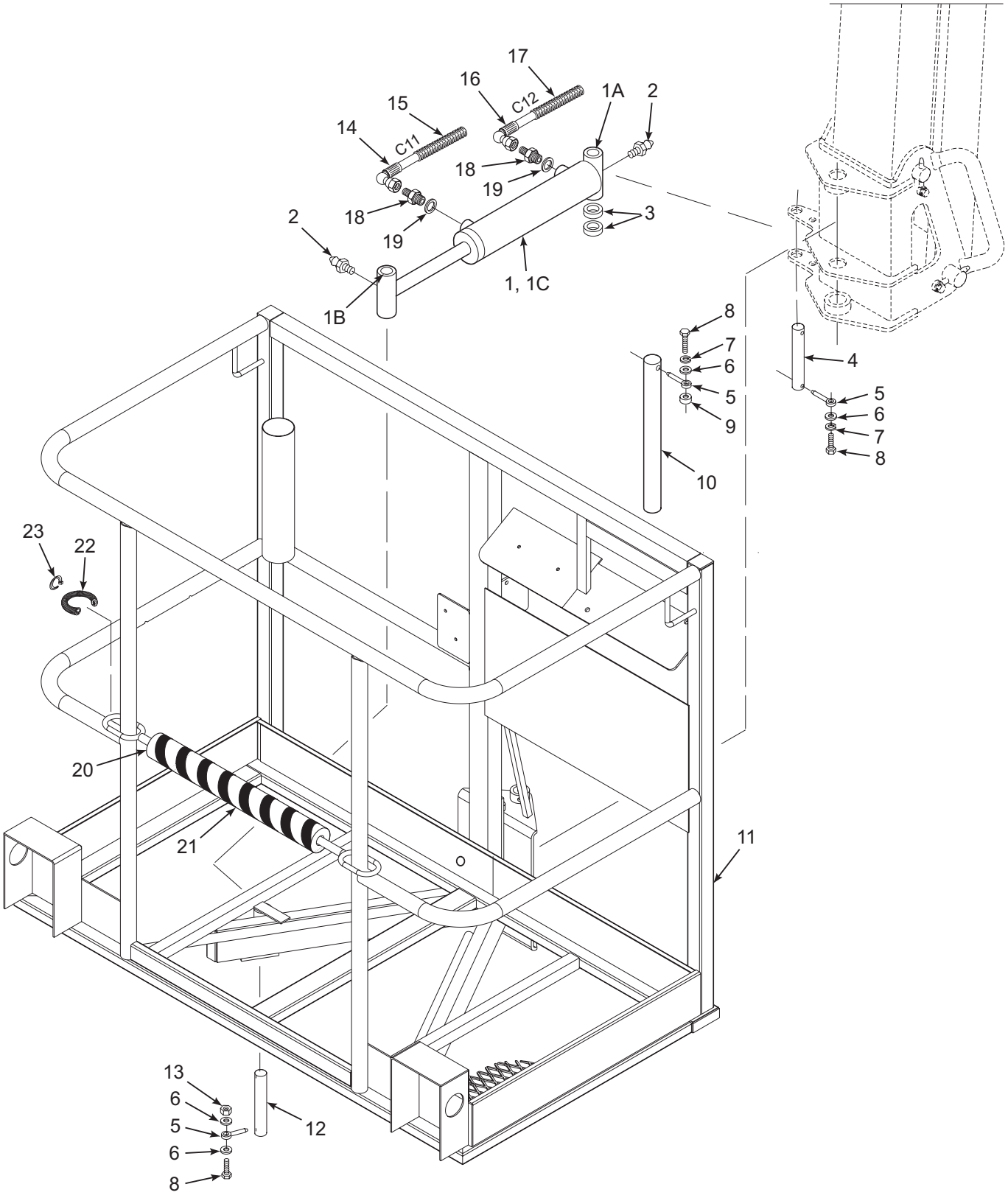


Figure 6-12. Basket

Table 6-12. Basket Parts List

Item No.	Part No.	Description	Qty
1	B02-03-0030	Hydraulic Cylinder, Cage	1
1A	B25-00-0087	Bushing, Cage Cylinder, Cylinder End	2
1B	B25-00-0085	Bushing, Cage Cylinder, Rod End	2
1C	B02-13-0110 B02-13-0116	Seal Kit, Cage Cylinder End Cap With Groove Seal Kit, Cage Cylinder End Cap Without Groove	1
2		Grease Fitting	2
3		Spacer	2
4	B36-00-0065	Pivot Pin, 16mm dia. x 102mm	1
5	B36-00-0042	Locking Pin	3
6		Flat Washer	3
7		Lock Washer	3
8		Cap Screw	3
9		Spacer	1
10	B36-00-0061	Pivot Pin, 25mm dia. x 330mm	1
11	B17-00-0126	Basket Weldment	1
12	B36-00-0064	Pivot Pin, 16mm dia. x 108mm	1
13		Hex Nut	1
14	B02-01-0165	Hydraulic Hose Assembly, 6 mm, C11	1
15		Flexible Sleeve	1
16	B02-01-0171	Hydraulic Hose Assembly, 6 mm, C12	1
17		Flexible Sleeve	1
18	B02-02-0210	Adapter, Straight 1/4 BSP Male-1/4 BSP Male	2
19	B02-00-0044	1/4 Dowty Washer	2
20	B05-00-0001	Tube, Foam, 21 1/2" Long	1
21	B06-00-0167	Caution Tape, Black and Yellow	1 Roll
22	B00-00-0086	Casing, Wire, Slit, 5/16” Dia. x 8 1/2" Long	2
23	B01-09-0030	Wire Tie, 3/32” x 7”	6

6-13 OUTRIGGER HYDRAULIC CONTROLS PARTS LIST

Refer to Table 6-13 for the outrigger hydraulic controls parts list.

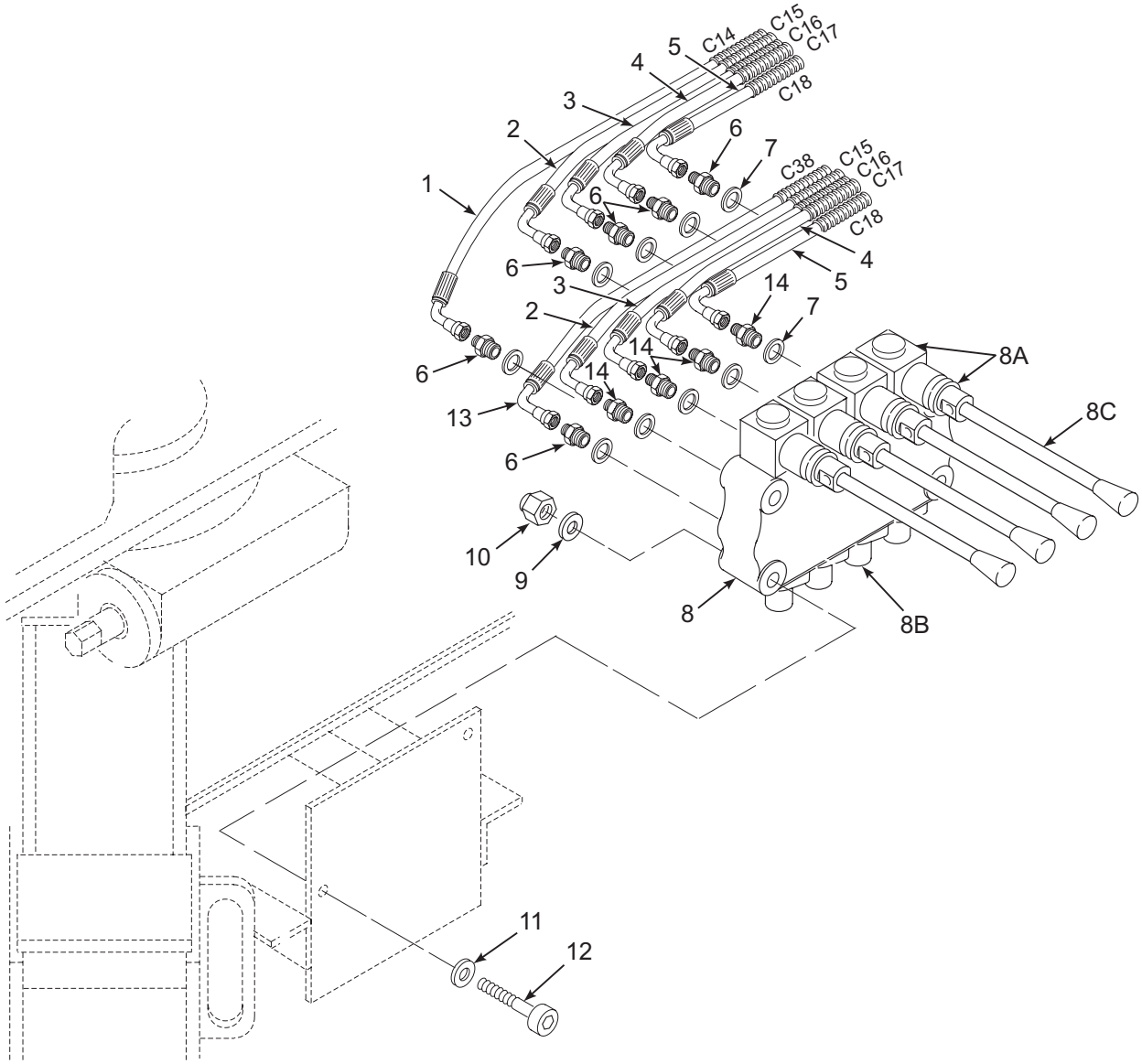


Figure 6-13. Outrigger Hydraulic Controls

Table 6-13. Outrigger Hydraulic Controls Parts List

Item No.	Part No.	Description	Qty
1	B02-01-0173	Hydraulic Hose Assembly, 6 mm, C14	1
2	B02-01-0174	Hydraulic Hose Assembly, 6 mm, C15	2
3	B02-01-0175	Hydraulic Hose Assembly, 6 mm, C16	2
4	B02-01-0176	Hydraulic Hose Assembly, 6 mm, C17	2
5	B02-01-0177	Hydraulic Hose Assembly, 6 mm, C18	2
6	B02-02-0205	Adapter, Straight, 1/4 BSP Male-3/8 BSP Male	6
7	B02-00-0043	3/8 Dowty Washer	10
8	B02-04-0075	Valve Control	1
8A	B02-14-0068	Lever Pivot Box With Gaiter	4
8B	B02-14-0069	End Cap With Spring	4
8C	B02-14-0053	Handle, Valve Control	4
9		Flat Washer	2
10		Self Locking Hex Nut	2
11		Flat Washer	2
12		Cap Screw	2
13		Hydraulic Hose Assembly, 6 mm, C38 (Gas Model Only)	1
14	B02-02-0204	Adapter, Straight With Orifice, 1/4 BSP Male-3/8 BSP Male	4

6-14 LOWER CONTROLS PARTS LIST

Refer to Table 6-14 for the lower controls parts list.

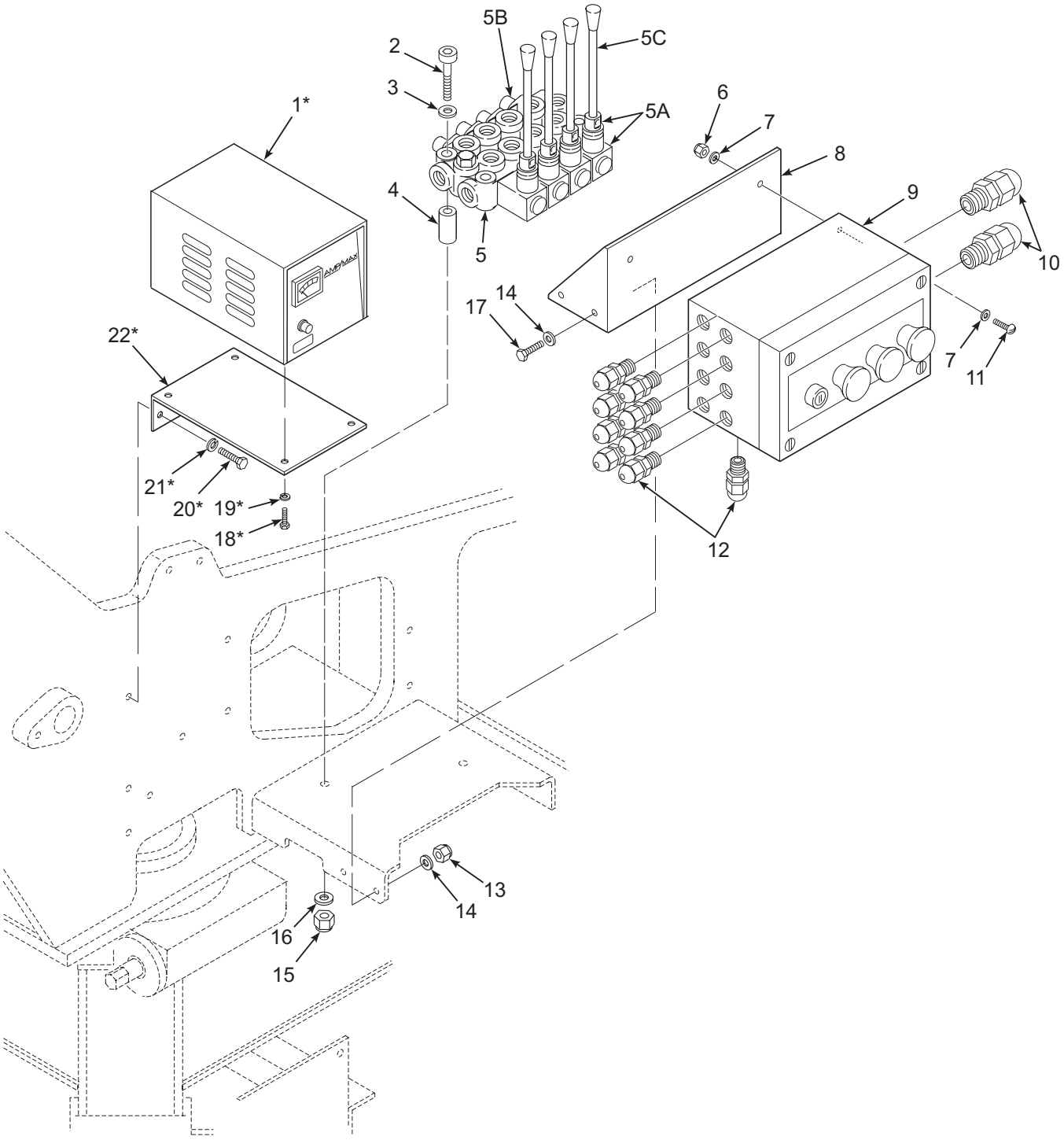


Figure 6-14. Lower Controls

Table 6-14. Lower Controls Parts List

Item No.	Part No.	Description	Qty
1*		Battery Charger	1
2		Cap Screw	2
3		Flat Washer	2
4		Standoff, Hex	2
5	B02-04-0074	Valve Control, Boom Lift	1
5A	B02-14-0068	Lever Pivot Box With Gaiter	4
5B	B02-14-0069	End Cap With Spring	4
5C	B02-14-0053	Handle, Valve Control	4
6		Hex Nut, Self Locking	4
7		Flat Washer	8
8		Support Bracket, Control Box	1
9		Lower Control Box	1
10		Strain Relief	2
11	B04-07-0130	Screw, 1/4 Turn, Control Box	6
12		Strain Relief	9
13		Hex Nut, Self Locking	4
14		Flat Washer	8
15		Hex Nut, Self Locking	2
16		Flat Washer	2
17		Cap Screw	4
18*		Cap Screw	4
19*		Lock Washer	4
20*		Cap Screw	2
21*		Lock Washer	2
22*		Support Bracket	1

* This item used on DC model boom lift only.

6-15 UPPER CONTROLS PARTS LIST

Refer to Table 6-15 for the upper controls parts list.

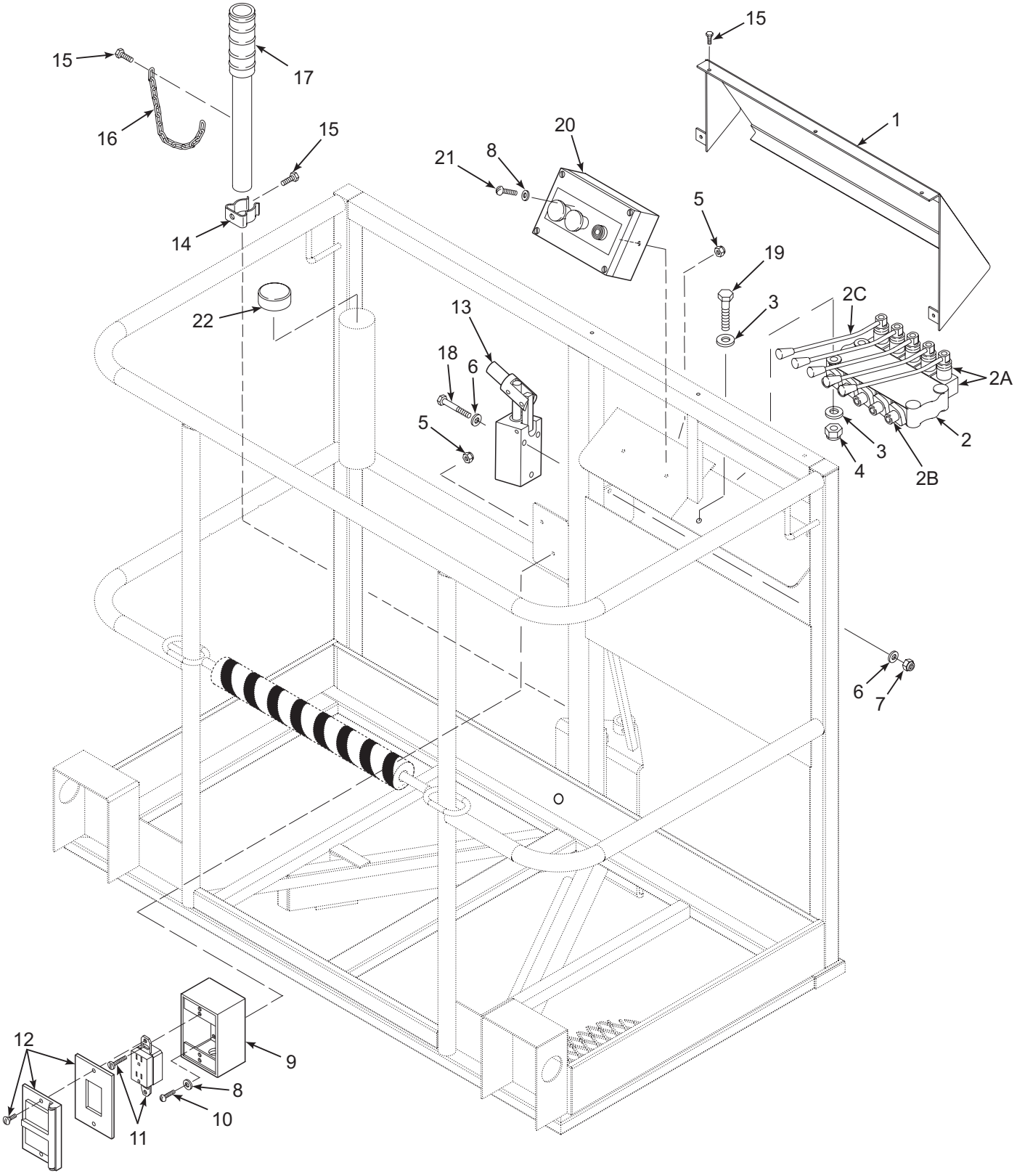


Figure 6-15. Upper Controls

Table 6-15. Upper Controls Parts List

Item No.	Part No.	Description	Qty
1	B17-00-0129	Cover, Basket Hydraulics	1
2	B02-04-0076	Valve Control	1
2A	B02-14-0068	Lever Pivot Box With Gaiter	5
2B	B02-14-0069	End Cap With Spring	5
2C	B02-14-0052	Handle, Valve Control	5
3	0090-0420	Flat Washer, 5/16”	4
4	0090-0185	Hex Nut, Self-locking, 5/16”-18	2
5	0090-0182	Hex Nut, Self-locking, 10-24	4
6	0090-0419	Flat Washer, 1/4”	4
7	0090-0183	Hex Nut, Self-locking, 1/4”-20	3
8	0090-0415	Flat Washer, #10	4
9	B01-10-0046	Junction Box, 110 Vac Outlet	1
10	0090-0232	Machine Screw, 10-24 x 3/8	2
11	B01-10-0034	Receptacle, 120 Vac, GFI	1
12	B01-10-0035	Cover, Junction Box	1
13		Manual Hydraulic Pump	1
14	B04-07-0120	Clamp	1
15	0090-0344	Screw, Self Tapping, #10-24 x 1/2	8
16	B40-00-0033	Chain	10 in.
17	B07-10-1200	Handle, Hydraulic Pump	1
18	0090-0456	Cap Screw, 1/4"-20 x 3”	3
19	0090-0037	Cap Screw, 5/16”-18 x 2 1/2"	2
20		Control Box, Upper	1
21	0090-0232	Machine Screw, #10-24 x 5/8”	4
22	B00-00-0014	Cap, Manual Tube	2

6-16 ENGINE COMPARTMENT PARTS LIST, GAS MODEL

Refer to Table 6-16 for the gas model engine compartment parts list.

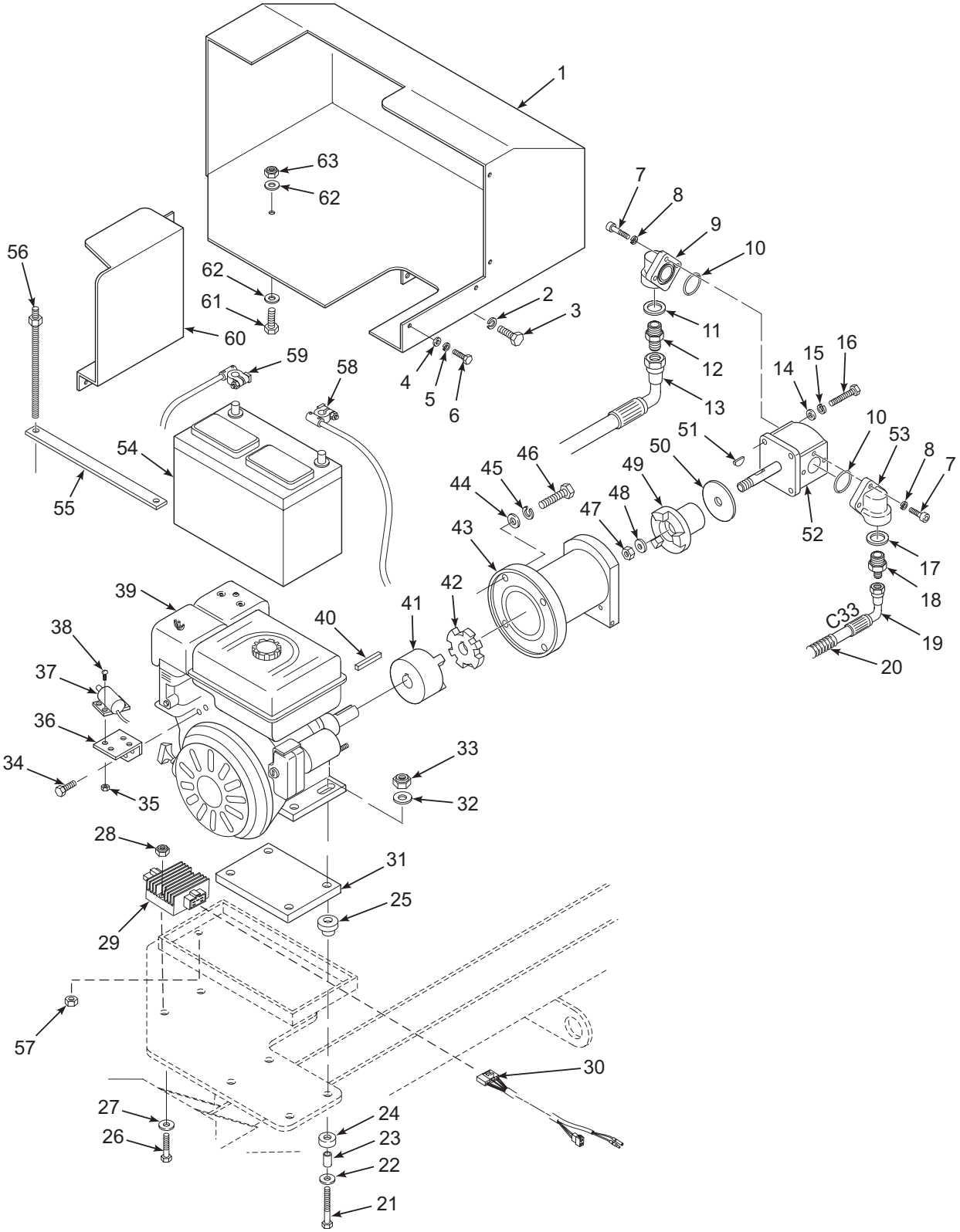


Figure 6-16. Engine Compartment Parts List, Gas Model

Table 6-16. Engine Compartment Parts List, Gas Model

Item No.	Part No.	Description	Qty
1		Engine Cover	1
2		Lock Washer	4
3		Cap Screw	4
4		Lock Washer	4
5		Flat Washer	4
6		Cap Screw	4
7		Socket Head Cap Screw	6
8		Lock Washer	6
9		Flange Adapter	2
10		O-ring	2
11		Seal Ring	1
12		Adapter, M/M	1
13		Hydraulic Hose Assembly, Pump Supply	1
14	0090-0420	Flat Washer, 5/16”	4
15	0090-0208	Lock Washer, 5/16”	4
16	0090-0030	Machine Screw, 5/16”-18 x 1”	4
17		Seal Ring	1
18		Adapter, M/M	1
19		Hydraulic Hose Assembly, 6mm, C33	1
20		Spiral Wrap	1
21	0090-0714	Cap Screw, 1/4"-20 x 2 3/4"	4
22	0090-0787	Washer, Fender	4
23	B07-10-1026	Spacer, Isolation Mount Ring	4
24	B20-00-0006	Ring, Isolation Mount	4
25	B20-00-0007	Bushing, Isolation Mount	4
26	0090-0010	Cap Screw, 1/4"-20 x 1 1/2"	2
27	0090-0419	Flat Washer, 1/4"	2
28	0090-0183	Nut, Lock, 1/4"-20	2
29	B20-00-0013	Rectifier/Regulator, Voltage, 12 Volt, 18 Amp	1
30		Rectifier/Regulator Harness	1
31	B07-06-5198	Engine Mount Plate	1
32	0090-0875	Flat Washer, USS, 1/4"	4
33	0090-0183	Nut, Lock, 1/4"-20	4
34	0090-0472	Sheet Metal Screw, #10 x 1/2"	2
35	0090-0180	Nut, Lock, #6-32	4
36	B29-00-0095	Bracket, Solenoid	1
37	B01-10-0084	Solenoid, Choke, 12 Volt	1
38	0090-0708	Machine Screw, #6-32 x 3/8”	4

6-16 ENGINE COMPARTMENT PARTS LIST, GAS MODEL

Refer to Table 6-16 for the gas model engine compartment parts list.

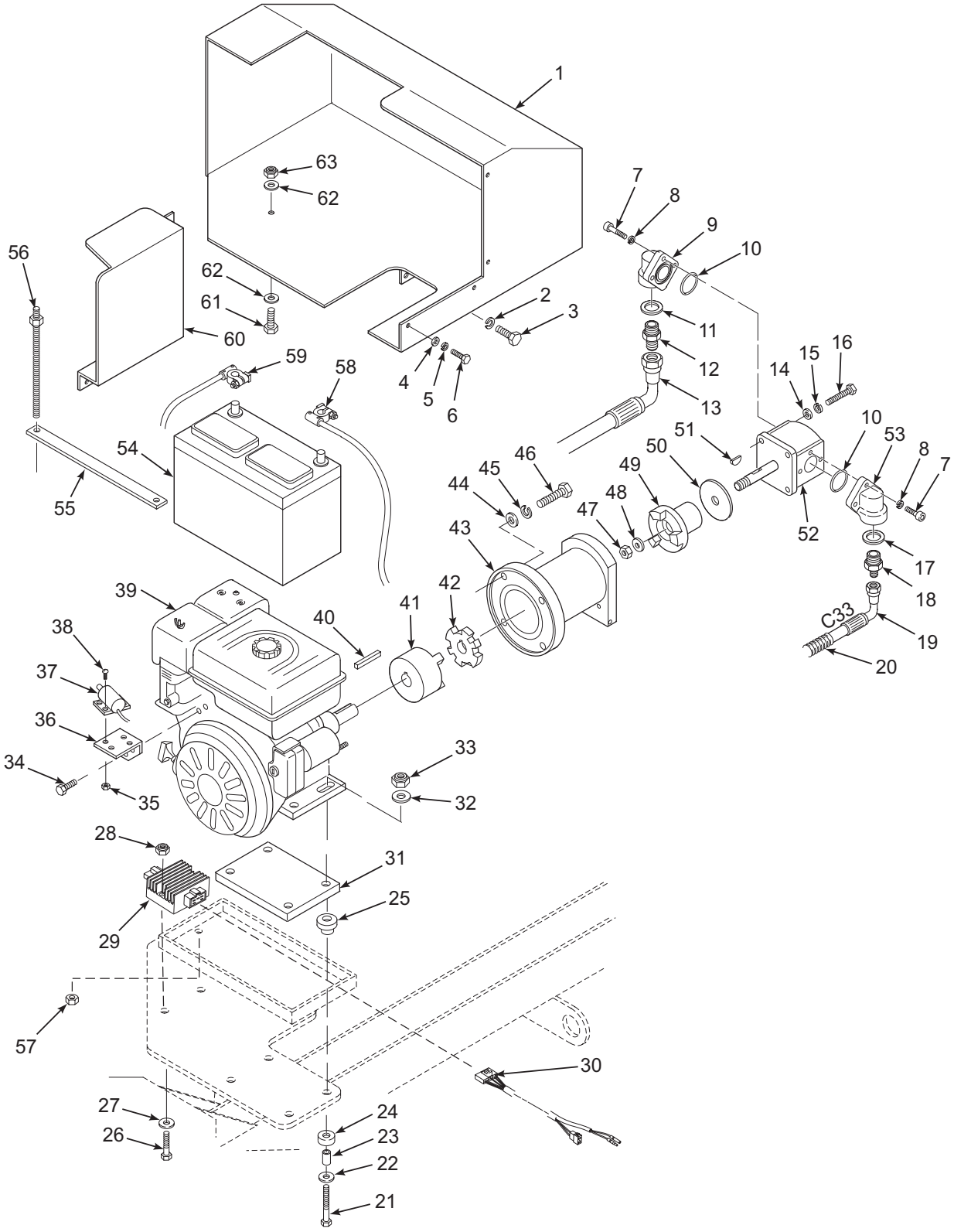


Figure 6-16. Engine Compartment Parts List, Gas Model

Table 6-16. Engine Compartment Parts List, Gas Model (continued)

Item No.	Part No.	Description	Qty
39	B20-00-0009	Engine, Honda, 8 Horsepower	1
40		Square Key	1
41		Coupling Half, Engine Shaft	1
42		Damper, Coupler	1
43		Bell Housing	1
44	0090-0420	Flat Washer, 5/16”	4
45	0090-0208	Lock Washer, 5/16”	4
46	0090-0974	Cap Screw, 5/16”-24 x 1”	4
47		Hex Nut	1
48		Flat Washer	1
49		Coupling Half, Pump Shaft	1
50		Washer	1
51		Woodruff Key	1
52	B02-05-0033	Hydraulic Pump, Gas Engine	1
53		Flange Adapter	1
54	B01-04-0013	Battery, 12 Volt DC	1
55	B07-06-5110	Hold-Down Strap, Battery	1
56	B04-07-0003	Hold-Down Rod, Battery	2
57	0090-0183	Nut, Lock, 1/4"-20	2
58	B01-01-0005	Battery Cable, 22”, Positive To Starter	1
59	B01-01-0006	Battery Cable, 16”, Negative To Bell Housing	1
60		Side Access Cover	1
61		Cap Screw	1
62		Flat Washer	2
63		Self Locking Hex Nut	1

6-17 BOOM CONTROL HYDRAULICS PARTS LIST, BASKET

Refer to Table 6-17 for the boom control hydraulics parts list.

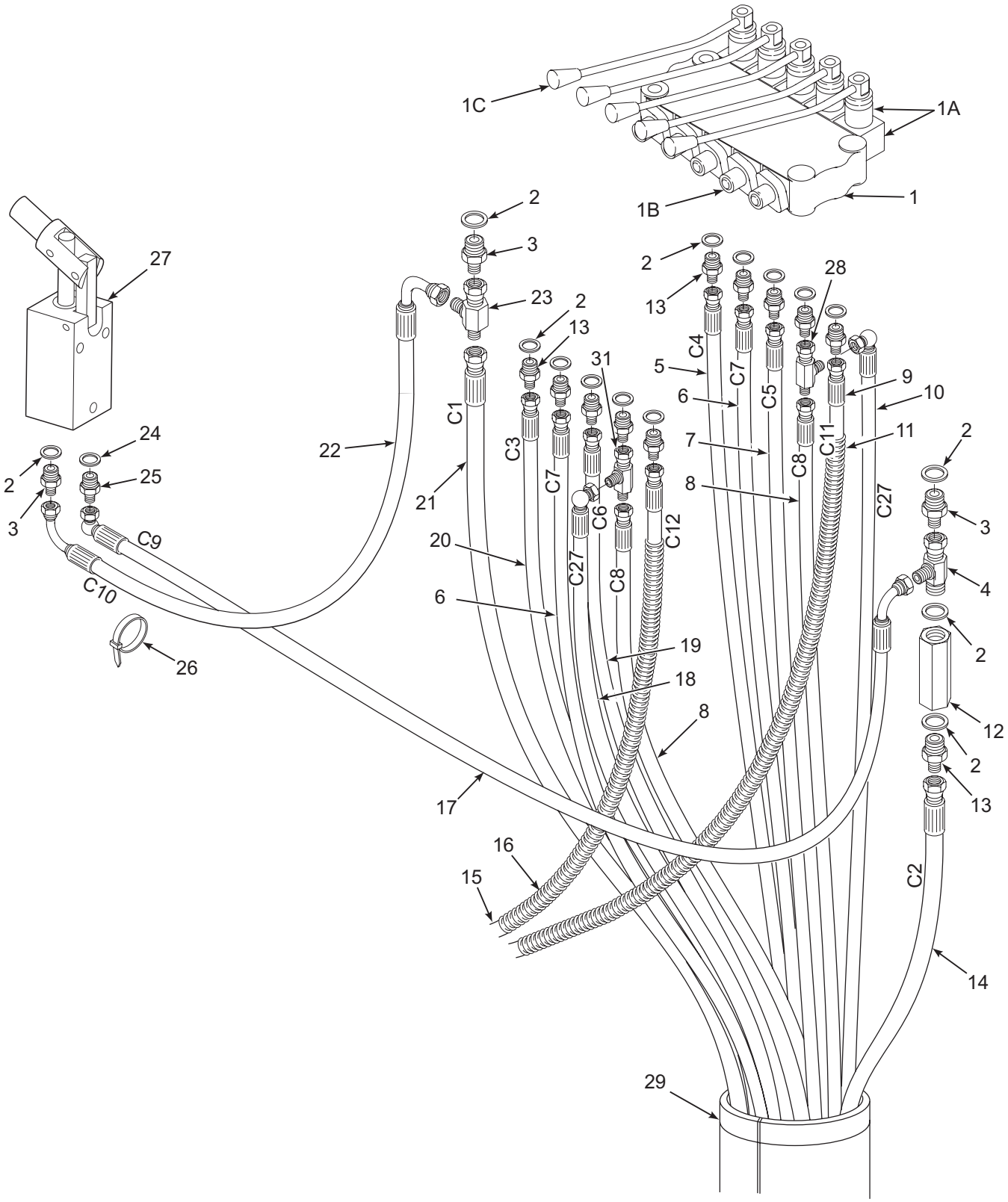


Figure 6-17. Boom Control Hydraulics, Basket

Table 6-17. Boom Control Hydraulics Parts List, Basket

Item No.	Part No.	Description	Qty
1	B02-04-0076	Valve Control, Basket	1
1A	B02-14-0068	Lever Pivot Box With Gaiter	5
1B	B02-14-0069	End Cap With Spring	5
1C	B02-14-0052	Handle, Valve Control	5
2	B02-00-0043	3/8 Dowty Washer	15
3	B02-02-0206	Adapter, Straight, 3/8 BSP Male-3/8 BSP Male	3
4	B02-02-0209	Tee Adapter, 3/8 BSP Female Swivel-1/4 BSP Male-3/8 BSP Male	1
5	B02-01-0159	Hydraulic Hose Assembly, 6 mm, C4	1
6	B02-01-0160	Hydraulic Hose Assembly, 6 mm, C7	2
7	B02-01-0166	Hydraulic Hose Assembly, 6 mm, C5	1
8	B02-01-0168	Hydraulic Hose Assembly, 6 mm, C8	2
9	B02-01-0165	Hydraulic Hose Assembly, 6 mm, C11	1
10	B02-01-0164	Hydraulic Hose Assembly, 6 mm, C27	1
11		Spiral Wrap	1
12		Check Valve	1
13	B02-02-0205	Adapter, Straight, 1/4 BSP Male-3/8 BSP Male	11
14	B02-01-0157	Hydraulic Hose Assembly, 10 mm, C2	1
15	B02-01-0171	Hydraulic Hose Assembly, 6 mm, C12	1
16		Spiral Wrap	1
17	B02-01-0169	Hydraulic Hose Assembly, 6 mm, C9	1
18	B02-01-0164	Hydraulic Hose Assembly, 6 mm, C27	1
19	B02-01-0167	Hydraulic Hose Assembly, 6 mm, C6	1
20	B02-01-0158	Hydraulic Hose Assembly, 6 mm, C3	1
21	B02-01-0156	Hydraulic Hose Assembly, 10 mm, C1	1
22	B02-01-0170	Hydraulic Hose Assembly, 10 mm, C10	1
23	B02-02-0208	Tee Adapter, 3/8 BSP Female Swivel-3/8 BSP Male-3/8 BSP Male	1
24	B02-02-0044	1/4 Dowty Washer	1
25	B02-02-0210	Adapter, Straight, 1/4 BSP Male-1/4 BSP Male	1
26		Wire Tie	AR
27		Pump, Emergency Down	1
28	B02-02-0207	Tee Adapter, 1/4 BSP Female Swivel-1/4 BSP Male-1/4 BSP Male	2
29		Cable Sleeve	1

6-18 BOOM CONTROL HYDRAULICS PARTS LIST, GROUND, GAS MODEL

Refer to Table 6-18 for the gas model boom control hydraulics parts list.

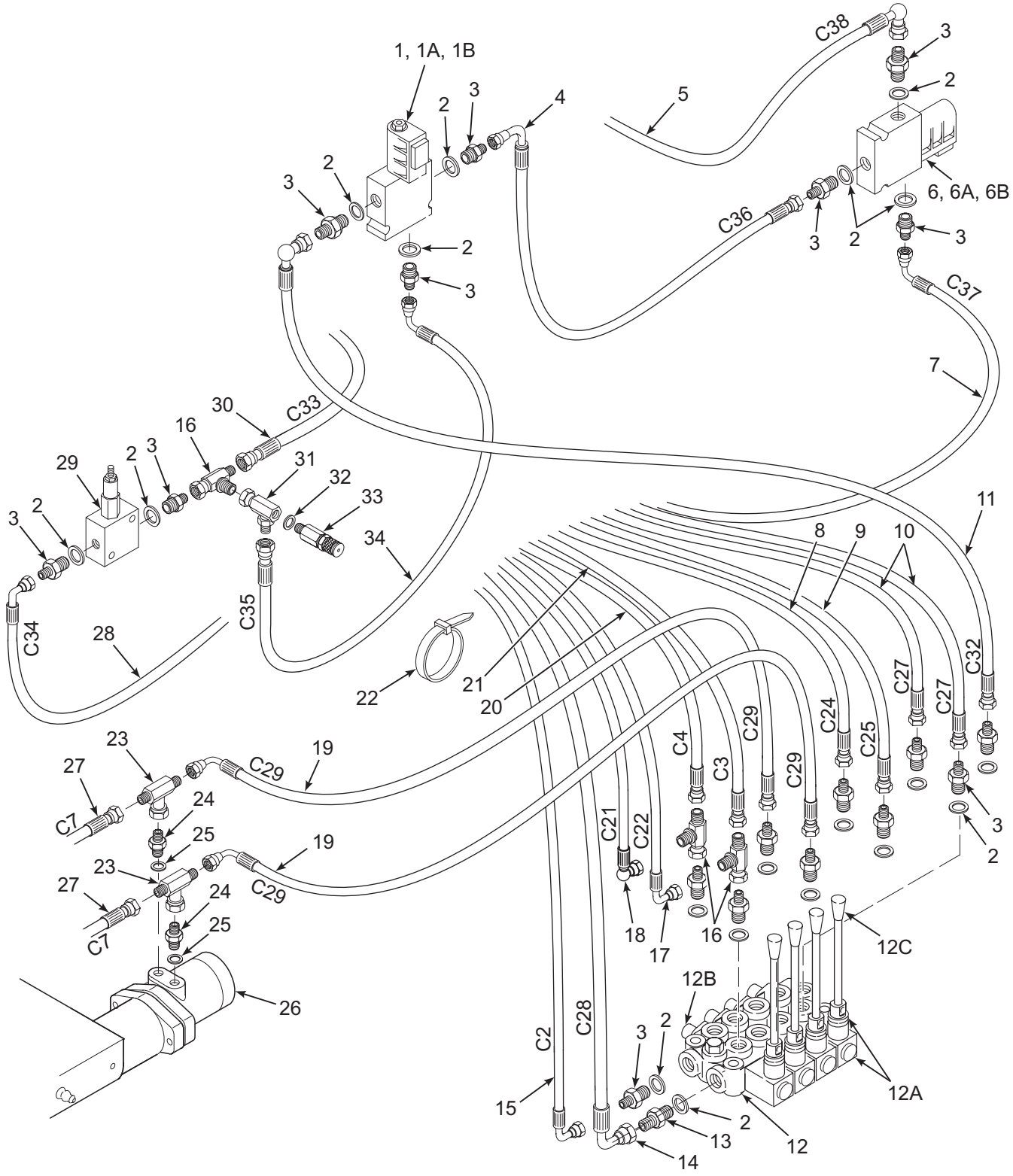


Figure 6-18. Gas Model Boom Control Hydraulics, Ground

Table 6-18. Gas Model Boom Control Hydraulics Parts List, Ground

Item No.	Part No.	Description	Qty
1	B02-04-0086	2-Way Solenoid Valve, SV1, Boom Enable	1
1A	B02-04-0072	Coil For Valve, SV1, 12V DC	1
1B	B02-14-0070	Valve Replacement, SV1	1
2	B02-00-0043	3/8 Dowty Washer	19
3	B02-02-0205	Adapter, Straight, 1/4 BSP Male-3/8 BSP Male	18
4		Hydraulic Hose Assembly, 6 mm, C36	1
5		Hydraulic Hose Assembly, 6 mm, C38	1
6	B02-04-0086	2-Way Solenoid Valve, SV2, Outriggers Enable	1
6A	B02-04-0072	Coil For Valve, SV2, 12V DC	1
6B	B02-14-0070	Valve Replacement, SV2	1
7		Hydraulic Hose Assembly, 6 mm, C37	1
8	B02-01-0161	Hydraulic Hose Assembly, 6 mm, C24	1
9	B02-01-0162	Hydraulic Hose Assembly, 6 mm, C25	1
10	B02-01-0164	Hydraulic Hose Assembly, 6 mm, C27	2
11		Hydraulic Hose Assembly, 6 mm, C32	1
12	B02-04-0074	Valve Control, Ground Station Boom	1
12A	B02-14-0068	Lever Pivot Box With Gaiter	4
12B	B02-14-0069	End Cap With Spring	4
12C	B02-14-0053	Handle, Control Valve	4
13	B02-02-0206	Adapter, Straight, 3/8 BSP Male-3/8 BSP Male	1
14	B02-01-0183	Hydraulic Hose Assembly, 10 mm, C28	1
15	B02-01-0157	Hydraulic Hose Assembly, 6 mm, C2	1
16	B02-02-0207	Tee Fitting, 1/4 BSP Female Swivel-1/4 BSP Male-1/4 BSP Male	3
17	B02-01-0181	Hydraulic Hose Assembly, 6 mm, C22	1
18	B02-01-0180	Hydraulic Hose Assembly, 6 mm, C21	1
19	B02-01-0184	Hydraulic Hose Assembly, 6 mm, C29	2
20	B02-01-0159	Hydraulic Hose Assembly, 6 mm, C4	1
21	B02-01-0158	Hydraulic Hose Assembly, 6 mm, C3	1
22		Wire Tie	AR
23	B02-02-0212	Tee Fitting, 1/4 BSP Male-1/4 BSP Female Swivel-1/4 BSP Male	2
24	B02-02-0211	Adapter, Straight, 1/4 BSP Male-1/2 BSP Male	2
25	B02-00-0042	1/2 Dowty Washer	2
26	B02-06-0009	Gear Motor, Boom Rotation	1
27	B02-01-0160	Hydraulic Hose Assembly, 6 mm, C7	2
28		Hydraulic Hose Assembly, 6 mm, C34	1
29		Pressure Valve, Hydraulic	1
30		Hydraulic Hose Assembly, 6 mm, C33	1
31		Tee Fitting, M/M/F	1
32		Seal Ring	1
33		Pressure Tap	1
34		Hydraulic Hose Assembly, 6 mm, C35	1

6-19 BOOM CONTROL HYDRAULICS PARTS LIST, GROUND, DC MODEL

Refer to Table 6-19 for the DC model boom control hydraulics parts list.

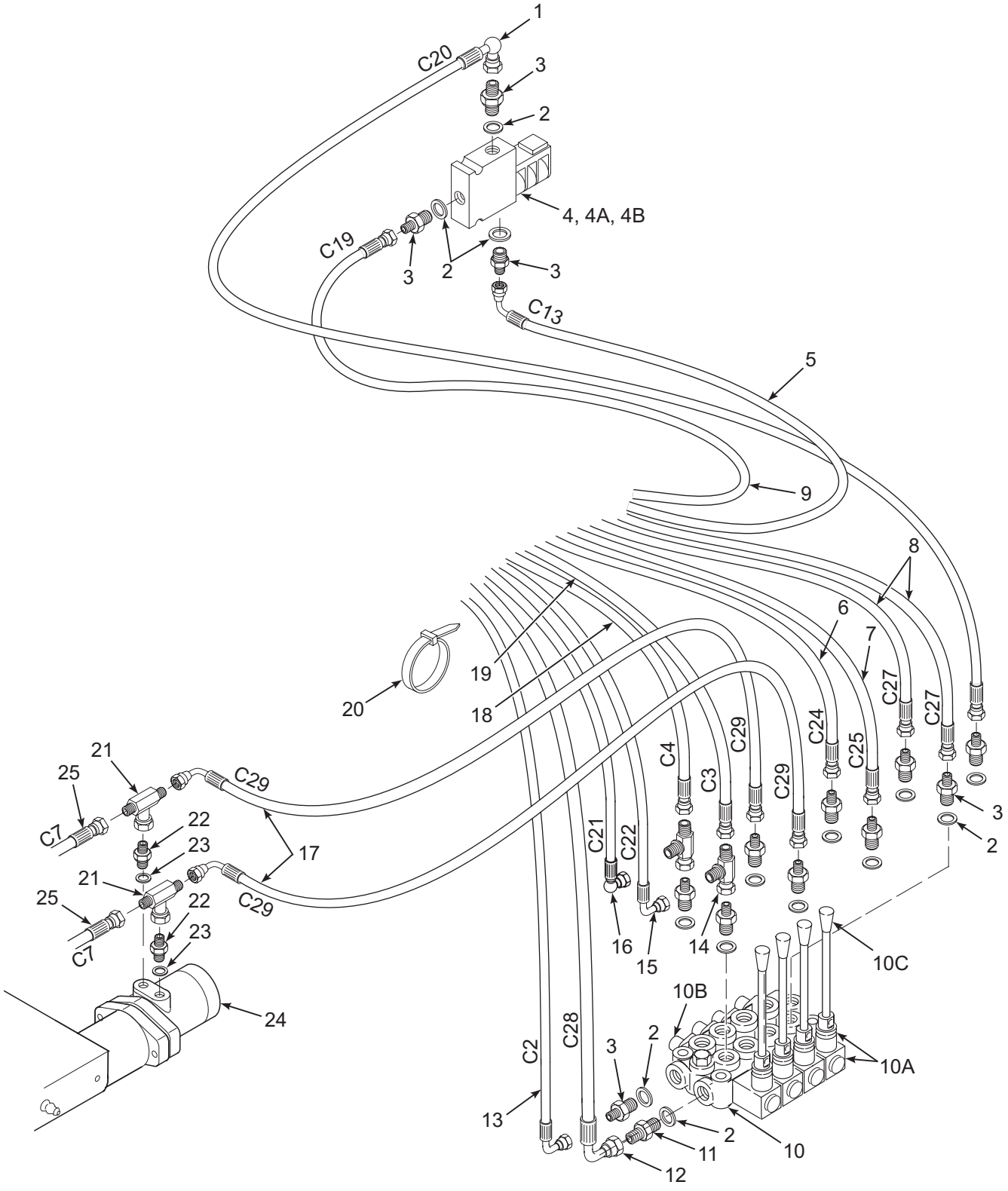


Figure 6-19. DC Model Boom Control Hydraulics, Ground

Table 6-19. DC Model Boom Control Hydraulics Parts List, Ground

Item No.	Part No.	Description	Qty
1	B02-01-0179	Hydraulic Hose Assembly, 6 mm, C20	1
2	B02-00-0043	3/8 Dowty Washer	15
3	B02-02-0205	Adapter, Straight, 1/4 BSP Male-3/8 BSP Male	14
4	B02-04-0085	2-Way Solenoid Valve, SV1, Boom Enable	1
4A	B02-14-0056	Coil For Valve, SV1, 24V DC	1
4B	B02-14-0070	Valve Replacement, SV1	1
5	B02-01-0172	Hydraulic Hose Assembly, 6 mm, C13	1
6	B02-01-0161	Hydraulic Hose Assembly, 6 mm, C24	1
7	B02-01-0162	Hydraulic Hose Assembly, 6 mm, C25	1
8	B02-01-0164	Hydraulic Hose Assembly, 6 mm, C27	2
9	B02-01-0178	Hydraulic Hose Assembly, 6 mm, C19	1
10	B02-04-0074	Valve Control, Ground Station Boom	1
10A	B02-14-0068	Lever Pivot Box With Gaiter	4
10B	B02-14-0069	End Cap With Spring	4
10C	B02-14-0053	Handle, Control Valve	4
11	B02-02-0206	Adapter, Straight, 3/8 BSP Male-3/8 BSP Male	1
12	B02-01-0183	Hydraulic Hose Assembly, 10 mm, C28	1
13	B02-01-0157	Hydraulic Hose Assembly, 6 mm, C2	1
14	B02-02-0207	Tee Fitting, 1/4 BSP Female Swivel-1/4 BSP Male-1/4 BSP Male	2
15	B02-01-0181	Hydraulic Hose Assembly, 6 mm, C22	1
16	B02-01-0180	Hydraulic Hose Assembly, 6 mm, C21	1
17	B02-01-0184	Hydraulic Hose Assembly, 6 mm, C29	2
18	B02-01-0159	Hydraulic Hose Assembly, 6 mm, C4	1
19	B02-01-0158	Hydraulic Hose Assembly, 6 mm, C3	1
20		Wire Tie	AR
21	B02-02-0212	Tee Fitting, 1/4 BSP Male-1/4 BSP Female Swivel-1/4 BSP Male	2
22	B02-02-0211	Adapter, Straight, 1/4 BSP Male-1/2 BSP Male	2
23	B02-00-0042	1/2 Dowty Washer	2
24	B02-06-0009	Gear Motor, Boom Rotation	1
25	B02-01-0160	Hydraulic Hose Assembly, 6 mm, C7	2

6-20 LOWER BOOM CYLINDER HYDRAULICS PARTS LIST

Refer to Table 6-20 for the lower boom cylinder hydraulics parts list.

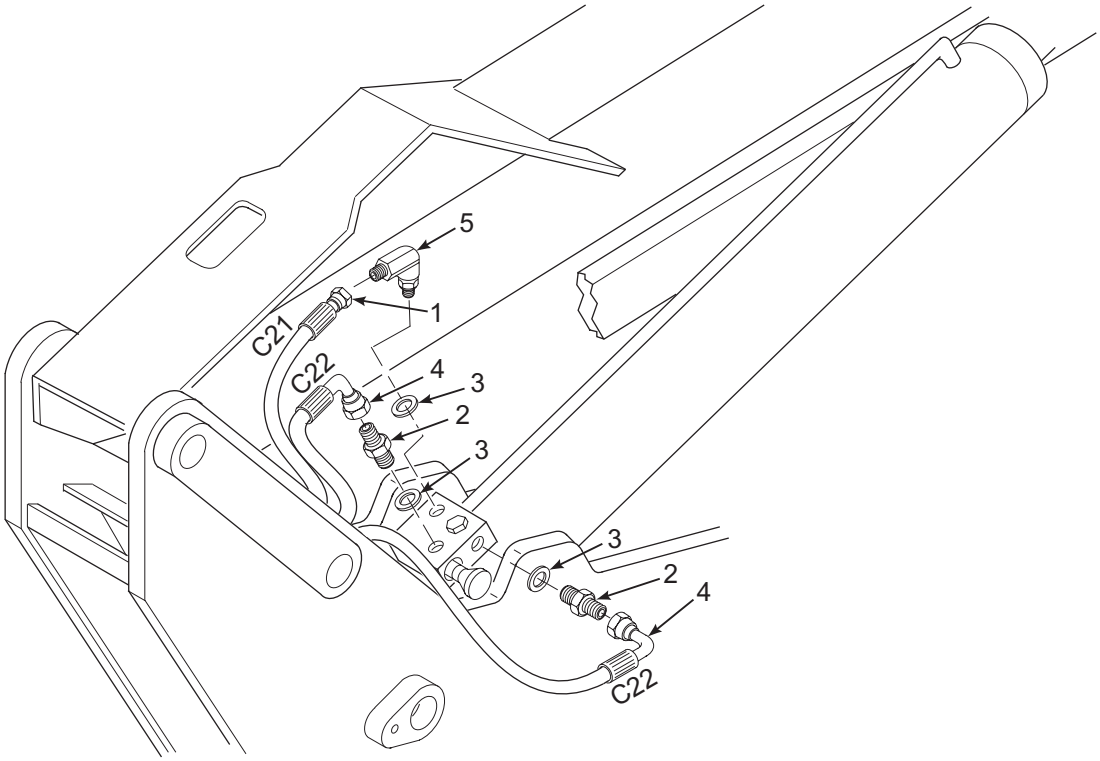


Figure 6-20. Lower Boom Cylinder Hydraulics

Table 6-20. Lower Boom Cylinder Hydraulics Parts List

Item No.	Part No.	Description	Qty
1	B02-01-0180	Hydraulic Hose Assembly, 6mm, C21	1
2	B02-02-0210	Adapter, Straight, 1/4 BSP Male-1/4 BSP Male	2
3	B02-00-0044	1/4 Dowty Washer	3
4	B02-01-0181	Hydraulic Hose Assembly, 6mm, C22	2
5	B02-02-0203	Elbow, 90°, 1/4 BSP Male-1/4 BSP Male	1

6-21 UPPER BOOM CYLINDER HYDRAULICS PARTS LIST

Refer to Table 6-21 for the upper boom cylinder parts list.

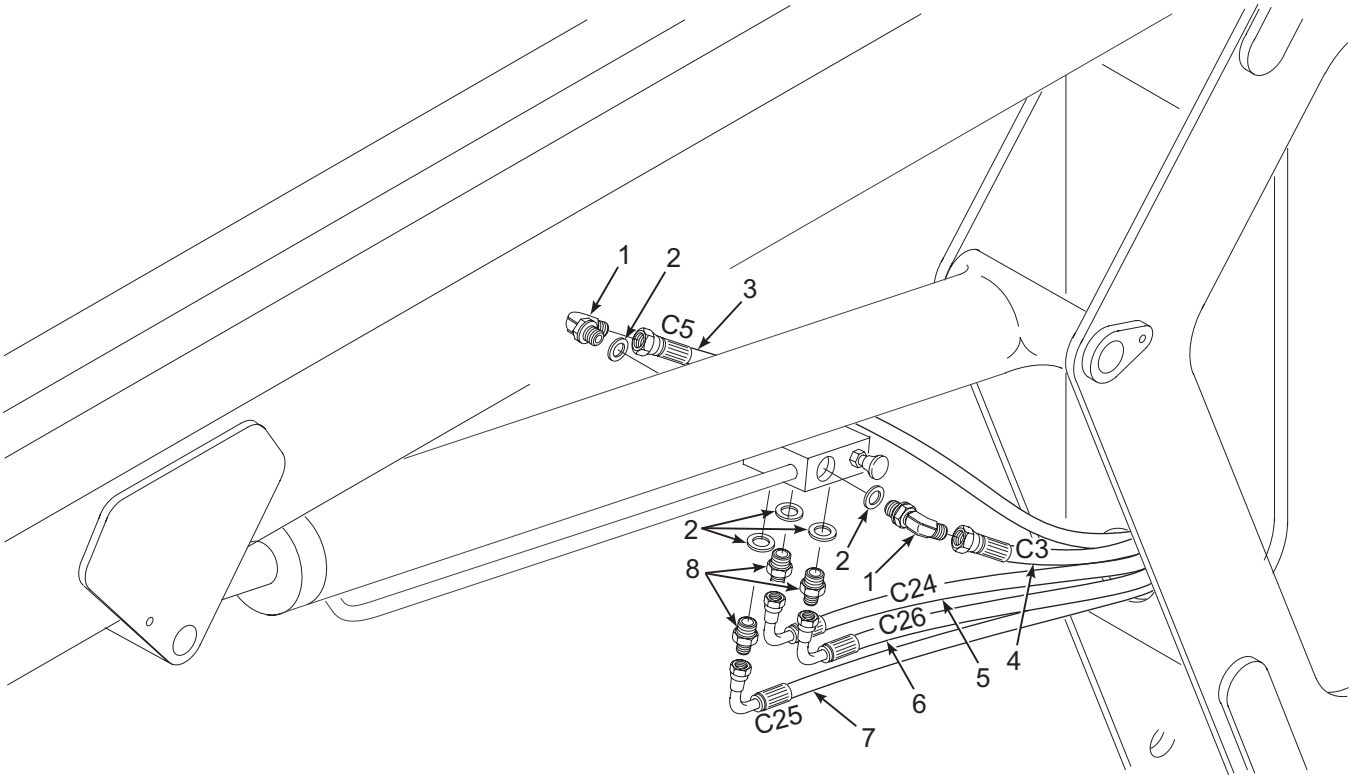


Figure 6-21. Upper Boom Cylinder Hydraulics

Table 6-21. Upper Boom Cylinder Hydraulics Parts List

Item No.	Part No.	Description	Qty
1	B02-02-0203	Elbow, 90°, 1/4 BSP Male-1/4 BSP Male	2
2	B02-00-0044	1/4 Dowty Washer	5
3	B02-01-0166	Hydraulic Hose Assembly, 6mm, C5	1
4	B02-01-0158	Hydraulic Hose Assembly, 6mm, C3	1
5	B02-01-0161	Hydraulic Hose Assembly, 6mm, C24	1
6	B02-01-0163	Hydraulic Hose Assembly, 6mm, C26	1
7	B02-01-0162	Hydraulic Hose Assembly, 6mm, C25	1
8	B02-02-0210	Adapter, Straight, 1/4 BSP Male-1/4 BSP Male	3

6-22 PUSHBUTTON PANEL PARTS LIST, BASKET

Refer to Table 6-22 for the basket pushbutton panel parts list.

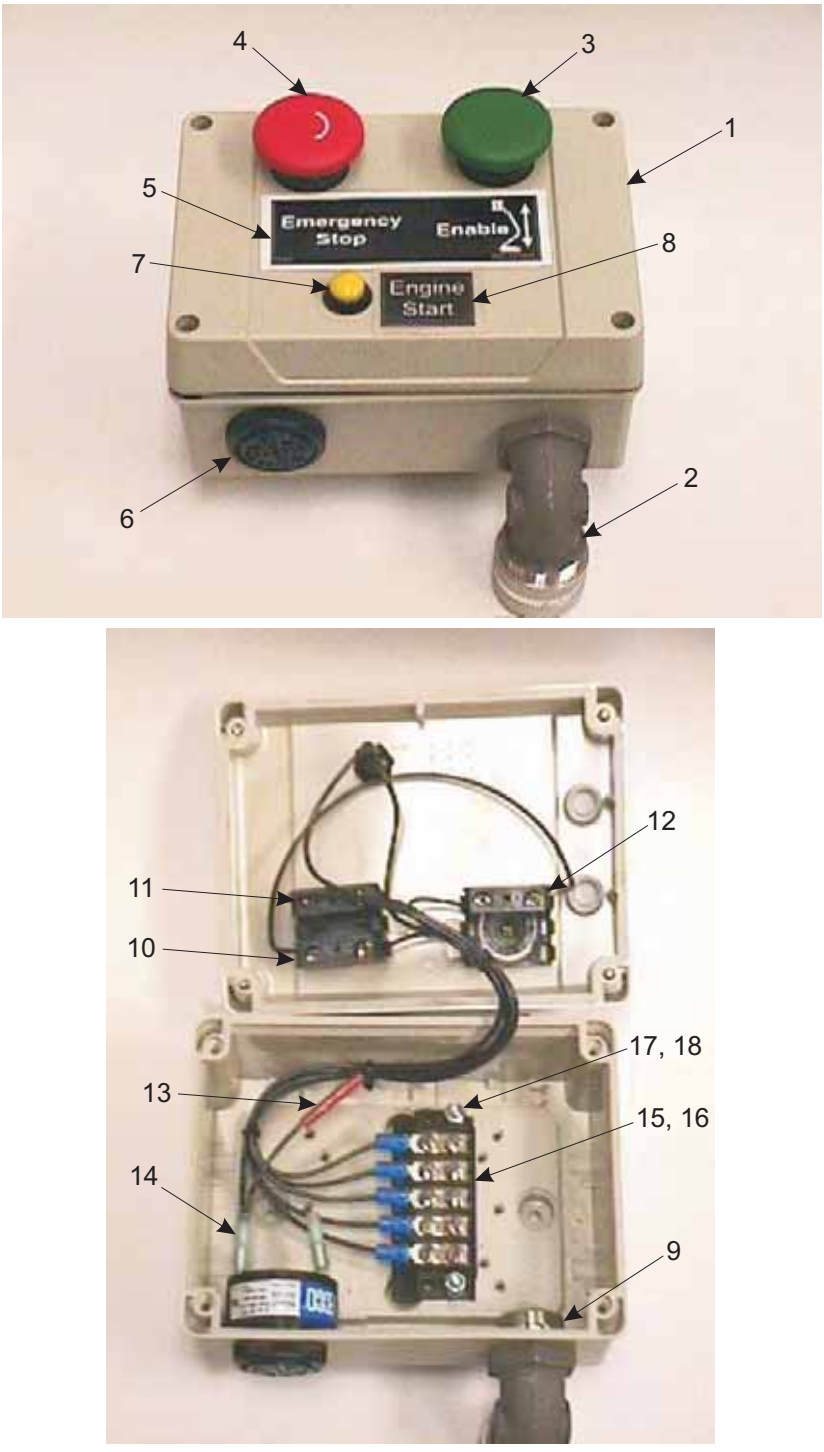


Figure 6-22. Basket Pushbutton Panel

Table 6-22. Basket Pushbutton Panel Parts List

Item No.	Part No.	Description	Qty
1	B19-00-0042 B19-00-0043	Enclosure, Upper Control Box, DC Model Enclosure, Upper Control Box, Gas Model	1
2	B01-09-0023	Cord Grip	1
3	B01-02-0085	Pushbutton Switch, Boom Enable, Green	1
4	B01-02-0084	Pushbutton Switch, Emergency Stop, Red	1
5	B06-00-0441	Decal, Upper Controls	1
6	B01-10-0002	Audible Warning Device (Alarm)	1
7	B01-02-0098	Pushbutton Switch, Engine Start, SW2, Yellow (Gas Model Only)	1
8	B06-00-0442	Decal, Engine Start (Gas Model Only)	1
9	B01-09-0021	Nut, Electric Lock	1
10	B01-02-0086	NC Contact	1
11	B01-02-0087	NO Contact (Gas Model Only)	1
12	B01-02-0087	NO Contact, DC Model NO Contact, Gas Model	2 1
13	B01-09-0050	Butt Splice	1
14	B01-09-0032	Female Spade	2
15	B01-10-0031 B01-10-0030	3-Position Terminal Strip, DC Model 5-Position Terminal Strip, Gas Model	1 1
16	B01-10-0090	5-Position Marker Strip (Gas Model Only)	1
17	0090-0813	Screw, Machine, 8-32 x 3/4"	2
18	0090-0181	Nut, Lock, 8-32	2

6-23 PUSHBUTTON PANEL PARTS LIST, GROUND CONTROLS

Refer to Table 6-23 for the pushbutton panel parts list.

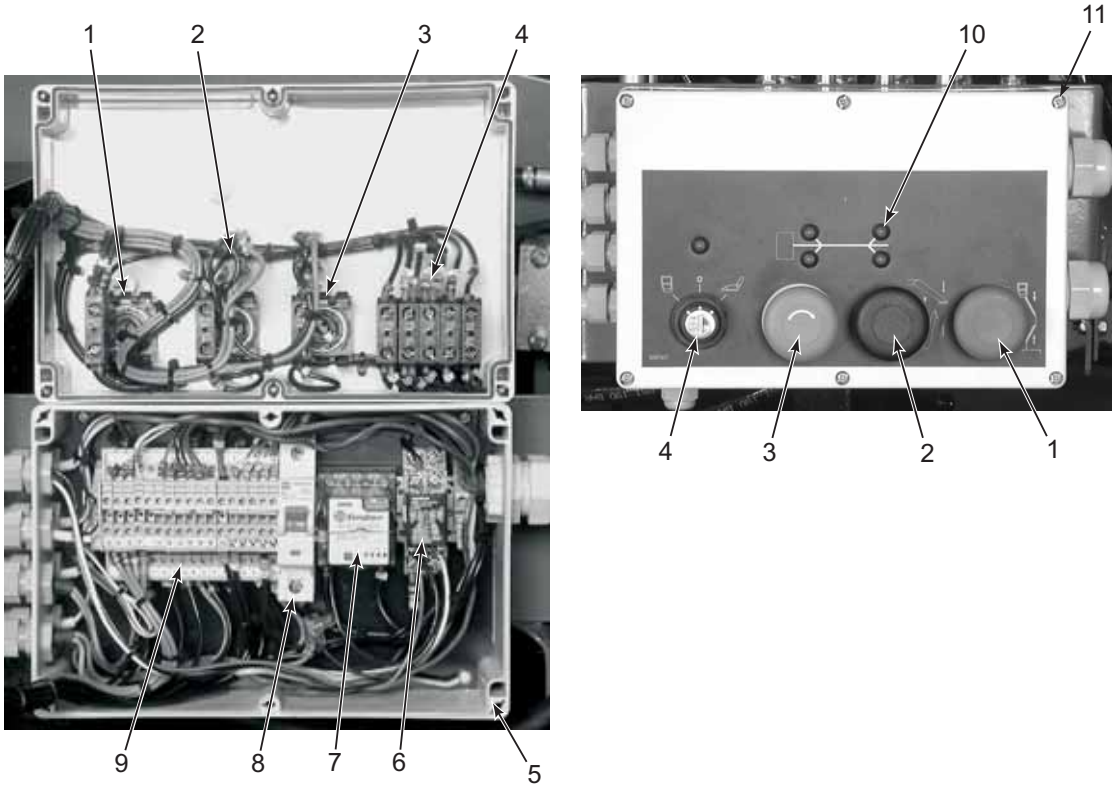


Figure 6-23. Pushbutton Panel, Ground Controls

Table 6-23. Pushbutton Panel Parts List, Ground Controls

Item No.	Part No.	Description	Qty
1	B01-02-0085	Pushbutton Switch, Boom Enable, PB2	1
2	B01-02-0089	Pushbutton Switch, Outriggers Enable, PB3	1
3	B01-02-0084	Pushbutton Switch, Emergency Stop, PB1	1
4	B01-02-0088	Key Switch, Basket/Off/Ground, SW1	1
4A	B01-02-0101	5-Contact Mount Adapter	
4B	B01-02-0102	Double NO Contact (Gas model only)	
5		Control Panel Closure	1
6		Alarm Relay, RL2	1
7		Motor Contactor (DC model only)	1
8		Circuit Breaker	1
9		Terminal Block Segment	AR
10	B01-10-0243	LED, Green	5
11	B04-07-0130	Screw, 1/4 Turn, Control Box	6
	B01-02-0086	NC Contact	
	B01-02-0087	NO Contact	

7
ANSI Reprint

The following sections are reprinted from the ANSI A92.2-2001 code in effect at the time of manufacture. Permission to reprint has been granted by the Scaffold Industry Association.

7. Responsibilities of Dealers and Installers

7.1 General Responsibilities. Each dealer or installer as applicable shall comply with the requirements of this section.

7.2 Vehicle Specifications. Each dealer or installer, or both, who sells an aerial device shall inform the owner or user, or both, of the manufacturer's minimum vehicle specifications.

7.3 Vehicle Weight Distribution. The installer shall be responsible for the weight distribution of the completed mobile unit in accordance with the requirements of the aerial device and the applicable regulations. Allowance shall be made for the weight of readily removable tools and material specified by the user.

7.4 Manuals. Upon delivery of the equipment to the owner or user, the dealer or installer shall provide the manuals as required by Paragraph 6.4 of this standard and manuals for auxiliary equipment added by the installer.

7.5 Installations. The installer shall comply with Sections 5 and 6 of this standard relating to proper installation and shall follow the instructions of the manufacturer. In the event the original manufacturer no longer exists, an equivalent entity may provide these instructions. The installer of an aerial device shall, before the mobile unit is placed in operation, perform stability tests in accordance with the requirements of 4.5.1 and 4.5.2, the operational and visual tests in accordance with the requirements of 6.6.1 and 6.6.2, and the appropriate electrical tests required in 5.4.3 of this standard. The installer shall, when installing an aerial device on a chassis which is a highway vehicle, comply with all requirements of the applicable Federal Motor Vehicle Safety Standards in effect at the time of installation. Certification as a manufacturer (alteration, intermediate or final) of a motor vehicle under the Federal Motor Vehicle Safety Standards is required. The travel height of the mobile unit shall be posted in a location that is readily visible to the vehicle operator. For insulated aerial devices, the installer shall assure conformance to the Qualification test requirements of 5.3.2 by either obtaining certification of the test and performing a periodic test after installation, or by performing the Qualification test.

7.6 Quality Assurance. The installer shall have a documented quality assurance program which will ensure compliance with this standard.

7.7 Welding. All welds made by the installer, whose failure could result in motion of the platform(s) shall meet the Structural Welding Code AWS D1.1-98 and AWS Dl.2-98. The installer shall establish applicable welding quality assurance procedures for all weldments.

7.8 Training. The dealer or installer shall offer training or training materials that aid owners and users in the operation, inspection, testing and maintenance of the aerial device. This training shall be offered initially and subsequently on request.

7.8.1 Dealer or Installer as User. Whenever a dealer or installer directs personnel to operate an aerial device (inspecting, sales demonstrations, or any form of use), the dealer or installer shall assume the responsibilities of users as specified in Section 9 of this standard. All personnel authorized to operate the aerial device shall have been trained.

8. Responsibilities of Owners

8.1 General Responsibilities. Each owner shall comply with the requirements of this section. The following responsibilities pertain to the owner's inspection, testing, maintenance, modification, training, and transfer of ownership. These activities shall be performed by qualified person(s).

8.2 Inspection and Testing Classifications.

8.2.1 Initial Inspection and Test. Prior to initial use, all new or modified mobile units shall be inspected and tested to ensure compliance with the provisions of this standard. Verification by the manufacturer, the installer or an equivalent entity(s), meets this requirement.

8.2.2 Regular Inspection and Tests. The inspection procedure for mobile units is divided into two classifications based upon the intervals at which inspections and tests shall be performed. Intervals shall be set by the owner in accordance with the manufacturer's recommendations. Such intervals are dependent upon component function and exposure to wear, deterioration and other agents which adversely affect component life. Two classifications are designated:

(1) Frequent Inspection and Test: Daily to monthly intervals.
(2) Periodic Inspection and Test: One to twelve month intervals.

8.2.3 Frequent Inspection and Test. Items determined by the owner in accordance with the manufacturer's recommendations for each specific aerial device shall be inspected for defects. The following tests and inspections shall be performed by the operator once daily, prior to first use:

(1) Operating controls and associated mechanisms for conditions interfering with proper operation.
(2) Visual and audible safety devices for malfunction.
(3) Hydraulic or pneumatic systems for observable deterioration or excessive leakage.
(4) Fiberglass and other insulating components for visible damage or contamination.
(5) Missing or illegible operational and instructional markings.
(6) Electrical systems of/or related to the aerial device for malfunction, signs of excessive deterioration, dirt and moisture accumulation.
(7) Visual inspection of bolts, pins, and other fasteners for loose, deformed or missing fasteners and other locking devices. Any suspected items shall be carefully examined or tested and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be replaced or repaired before use.

8.2.4 Periodic Inspection or Test. An inspection of the mobile unit shall be performed at the intervals defined in 8.2.2 depending upon its activity, severity of service, and environment, or as specifically indicated below. (These inspections shall include the requirements of 8.2.3):

(1) Structural members for deformation, cracks or corrosion
(2) Parts, such as pins, bearings, shafts, gears, rollers, locking devices, chains, chain sprockets, wire and synthetic ropes, and sheaves for wear, cracks or distortion.
(3) Hydraulic and pneumatic relief valve settings.
(4) Hydraulic system for proper oil level.
(5) Hydraulic and pneumatic fittings, hoses, and tubing for evidence of leakage, abnormal deformation or excessive abrasion.
(6) Compressors, pumps, motors, and generators for loose fasteners, leaks, unusual noises or vibrations, loss of operating speed, and excessive heating.
(7) Hydraulic and pneumatic valves for malfunction and visible cracks in the external valve housing, leaks, and sticking spools.
(8) Visually inspect any vacuum prevention systems and verify function of such systems on Category "A" aerial devices.

(9) Hydraulic and pneumatic cylinders and holding valves for malfunction and visible damage.
(10) Hydraulic and pneumatic filters for cleanliness and the presence of foreign material in the system indicating other component deterioration.
(11) Electrical systems and components for deterioration or wear including those not readily visible on a frequent inspection.
(12) Performance test of all boom movements.
(13) Condition and tightness of bolts and other fasteners.
(14) Welds, as specified by the manufacturer.
(15) Legible and proper identification, operational, and instructional markings.
(16) If the aerial device is rated as an insulated device, the electrical insulating components and system(s) shall be thoroughly inspected for lack of cleanliness and other conditions that compromise insulation. Then these components and system(s) shall be tested for compliance with the rating of the aerial device in accordance with one of the applicable methods and procedures as outlined in section 5.4.3 of this standard:
(a) If the aerial device is used for AC bare-hand work, the unit shall undergo a 60 Hz test as shown in Table 2 at least every three years;
(b) If the aerial device is used for DC bare-hand work, the unit shall undergo a DC test as shown in Table 2 at least every three years;
(c) After repair or modification of any component that crosses the insulating system(s), or the repair or replacement of an insulating component(s), the unit shall be dielectrically tested in accordance with section 5.4.3;
(d) An insulated replacement boom shall be tested to insure conformance to 5.3.3 by the supplier;
(e) Bare-hand work units shall be tested as shown in Table l after any major repair to the insulated boom or any insulated boom replacement. Any suspected items shall be carefully examined or tested and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be replaced or repaired before use.

8.3 Inspection and Test Records.
(l) Items to be inspected shall be designated to the operator or other authorized person making frequent inspections. Records of frequent inspections need not be made. However, where a safety hazard is found, it shall be reported in writing to a person responsible for the corrective action and that report and a record of the correction shall be maintained for five years, or as required by applicable regulations.
(2) Written, dated and signed reports and records shall be made of periodic inspections and tests and retained for a period of five years or as required by applicable regulations.

8.4 Maintenance. Maintenance and frequency of maintenance shall be determined by the owner in accordance with the manufacturer's recommendations. Welding repairs of components or welds, designated as critical in the manufacturers manual, shall be made in accordance with the manufacturers recommendations. Should the original manufacturer no longer exist an equivalent entity may determine the required procedure.

8.4.1 Maintenance Training. The owner shall train their maintenance personnel in inspection and maintenance of the aerial device in accordance with the manufacturer's recommendations and Section 8 of this standard.

8.5 Modifications. No modifications or additions which affect the stability, mechanical, hydraulic, or electrical integrity or the safe operation of the aerial device shall be made without the written approval of the manufacturer. If such modifications or changes are made, the capacity, operation, and maintenance instruction markings shall be changed accordingly. In no case shall the safety factors be reduced below those specified in this standard or below the manufacturers design safety factors, whichever are greater. Should the original manufacturer no longer exist, an equivalent entity may approve required modification.

8.6 Weight Distribution. Changes in loading or additions made to the mobile unit after the final acceptance that affect weight distribution shall meet applicable regulations

by governmental agencies. In no case shall axle loads of the fully loaded vehicle exceed the Gross Axle Weight Ratings (GAWR) assigned by the manufacturer. Note: Any change in weight distribution may adversely affect stability.

8.7 Transfer of Ownership. When a change in ownership of an aerial device occurs, it shall be the responsibility of the seller to provide the manufacturer's manual(s) for that aerial device to the purchaser. It is the responsibility of the purchaser to notify the manufacturer of the unit model and serial number and the name and address of the new owner within 60 days.

8.8 Markings. The markings on the aerial device shall not be removed, defaced, or altered. All missing or illegible markings shall be promptly replaced.

8.9 Parts. When parts or components are replaced they shall be identical in specification and function to the original aerial device parts or components or shall provide an equal or greater factor of safety.

8.10 Safety Bulletins. Owners shall comply with safety related bulletins as received from the manufacturer, dealer or installer.

8.11 Manuals. The owner shall insure that the operating manual(s) is stored on the mobile unit.

8.12 Training, Retraining, and Familiarization of Operators.

8.12.1 Owner as a Renter or Lessor. When an owner functions as a renter or lessor he shall have the same responsibilities as specified under Section 11 of this standard.

8.12.2 General Training. Only personnel who have received general instructions regarding the inspection, application and operation of aerial devices, including recognition and avoidance of hazards associated with their operation, shall operate an aerial device. Such items covered shall include, but not necessarily be limited to, the following issues and requirements:

(1) The purpose and use of manuals.
(2) That operating manuals are an integral part of the aerial device and must be properly stored on the vehicle when not in use.
(3) A pre-start inspection.
(4) Responsibilities associated with problems or malfunctions affecting the operation of the aerial device.
(5) Factors affecting stability.
(6) The purpose of placards and decals.
(7) Workplace inspection.
(8) Applicable safety rules and regulations, such as Part 4, ANSI C2-1997, National Electrical Safety Code (applies to utility workers as defined in ANSI C2). The above standard is an example; other industries using aerial devices have safety rules pertinent to that industry.
(9) Authorization to operate.
(10) Operator warnings and instructions.
(11) Actual operation of the aerial device. Under the direction of a qualified person, the trainee shall operate the aerial device for a sufficient period of time to demonstrate proficiency in the actual operation of the aerial device.
(12) Proper use of personal fall protection equipment

8.12.3 Retraining. The operator shall be retrained, when so directed by the user, based on the user's observation and evaluation of the operator.

8.12.4 Familiarization. When an operator is directed to operate an aerial device he/she is not familiar with, the operator, prior to operating, shall be instructed regarding the following items and issues :

(1) The location of the manuals.
(2) The purpose and function of all controls.
(3) Safety devices and operating characteristics specific to the aerial device.

9. Responsibility of Users.

9.1 General Responsibilities. Each User shall comply with the requirements of this section.

9.2 Personnel. Only trained and authorized personnel shall be permitted to operate the aerial device.

9.3 Training, Retraining, and Familiarization of Operators.

9.3.1 General Training. Only personnel who have received general instructions regarding the inspection, application and operation of aerial devices, including recognition and avoidance of hazards associated with their operation, shall operate an aerial device. Such items covered shall include, but not necessarily be limited to, the following issues and requirements:

(1) The purpose and use of manuals.
(2) That operating manuals are an integral part of the aerial device and must be properly stored on the vehicle when not in use.
(3) A pre-start inspection.
(4) Responsibilities associated with problems or malfunctions affecting the operation of the aerial device.
(5) Factors affecting stability.
(6) The purpose of placards and decals.
(7) Workplace inspection.
(8) Applicable safety rules and regulations, such as Part 4, ANSI C2-1997, National Electrical Safety Code. (applies to utility workers as defined in ANSI C2). The above standard is an example; other industries using aerial devices have safety rules pertinent to that industry.
(9) Authorization to operate.
(10) Operator warnings and instructions.
(11) Actual operation of the aerial device. Under the direction of a qualified person, the trainee shall operate the aerial device for a sufficient period of time to demonstrate proficiency in the actual operation of the aerial device.
(12) Proper use of personal fall protection equipment

9.3.2 Retraining. The operator shall be retrained, when so directed by the user, based on the user's observation and evaluation of the operator.

9.3.3 Familiarization. When an operator is directed to operate an aerial device he/she is not familiar with, the operator, prior to operating, shall be instructed regarding the following items and issues:

(1) The location of the manuals.
(2) The purpose and function of all controls.
(3) Safety devices and operating characteristics specific to the aerial device.

9.4 Application. The employer and assigned operator shall insure that the aerial device is used only for intended applications as defined in the operating manual, and that recognized safety practices are observed.

9.5 Mobile Operation. Before and during driving, the driver shall:

(1) Avoid traveling on any surface that adversely affects vehicle stability.
(2) Maintain a safe distance from obstacles and overhead lines.
(3) Maintain communications between the driver and the operator.
(4) Under all travel conditions, the driver shall limit travel speed in accordance with conditions of the ground surface, congestion, and slope.

9.6 Alterations. Altering or disabling of safety devices, guards, or interlocks if so equipped shall be prohibited.

9.7 Bare-Hand Work. For bare-hand work, a Category "A" aerial device shall be used.

9.8 Lower Controls. The lower controls of aerial devices shall not be used for continuous operation with personnel in the platform.

10. Responsibilities of Operators

10.1 General Responsibilities. Each operator shall comply with the requirements of this section.

10.2 Operation. During operation of the aerial device all platform occupants shall use appropriate fall protection connected to the aerial device at the platform position.

10.3 Work Platform. The operator shall not use railings, planks, ladders or any other device in or on the work platform for achieving additional working height or reach.

10.4 Brakes. The vehicle parking brake(s) shall be set at all times that the boom is elevated except when the aerial device is being used in accordance with 9.5.

10.5 Loading. Any loading which includes a horizontal load shall be avoided unless the mobile unit is designed for that application.

10.6 Observations. Observations during operation for any defects shall be conducted on an ongoing basis.

10.6.1 Pre-start Inspection. Items determined by the owner in accordance with the manufacturer's recommendations for each specific aerial device shall be inspected for defects prior to each day's operation. The following tests and inspections shall be performed by the operator once daily, prior to first use:

(1) Operating controls and associated mechanisms for conditions interfering with proper operation.
(2) Visual and audible safety devices for malfunction.
(3) Hydraulic or pneumatic systems for observable deterioration or excessive leakage.
(4) Fiberglass and other insulating components for visible damage or contamination.
(5) Missing or illegible operational and instructional markings.
(6) Electrical systems of/or related to the aerial device for malfunction, signs of excessive deterioration, dirt and moisture accumulation.
(7) Visual inspection of bolts, pins, and other fasteners for loose, deformed or missing fasteners and other locking devices. Any suspected items shall be carefully examined or tested and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be replaced or repaired before use.

10.7 Worksite. Before the aerial device is used the worksite shall be surveyed for hazards such as:

(1) Untamped earth fills.
(2) Ditches.
(3) Dropoffs and floor obstructions.
(4) Debris.
(5) Overhead obstructions and electrical conductors.
(6) Weather conditions.
(7) Presence of unauthorized persons.

10.8 Precautions. Before and during each use the operator shall:

(1) Check for overhead obstructions and electrical conductors.
(2) Insure that the load on the platform and/or load lifting devices are in accordance with the manufacturer's rated capacity.
(3) Insure that outriggers and stabilizers are used if the manufacturer's instructions require their use.
(4) Insure that guardrails are properly installed, and the gates are closed.
(5) Use outrigger pads when necessary to provide firm footing.

10.9 Mobile Operation. Before engaging in mobile operation the operator shall determine that the aerial device is specifically designed for mobile operation.

10.10 Personnel. Only trained and authorized personnel shall be permitted to operate the aerial device.

10.11 Training, Retraining, and Familiarization of Operators.

10.11.1 General Training. Only personnel who have received general instructions regarding the inspection, application and operation of aerial devices, including recognition and avoidance of hazards associated with their operation, shall op-

erate an aerial device. Such items covered shall include, but not necessarily be limited to, the following issues and requirements:

(1) The purpose and use of manuals.
(2) That operating manuals are an integral part of the aerial device and must be properly stored on the vehicle when not in use.
(3) A pre-start inspection.
(4) Responsibilities associated with problems or malfunctions affecting the operation of the aerial device.
(5) Factors affecting stability.
(6) The purpose of placards and decals.
(7) Workplace inspection.
(8) Applicable safety rules and regulations, such as Part 4, ANSI C2-1997, National Electrical Safety Code (applies to utility workers as defined in ANSI C2). The above standard is an example; other industries using aerial devices have safety rules pertinent to that industry.
(9) Authorization to operate.
(10) Operator warnings and instructions.
(11) Actual operation of the aerial device. Under the direction of a qualified person, the trainee shall operate the aerial device for a sufficient period of time to demonstrate proficiency in the actual operation of the aerial device.
(12) Proper use of personal fall protection equipment

10.11.2 Retraining. The operator shall be retrained, when so directed by the user, based on the user's observation and evaluation of the operator.

10.11.3 Familiarization. When an operator is directed to operate an aerial device he/she is not familiar with, the operator, prior to operating, shall be instructed regarding the following items and issues:

(1) The location of the manuals.
(2) The purpose and function of all controls.
(3) Safety devices and operating characteristics specific to the aerial device.

11. Responsibilities of Renters, Lessors or Lessees

11.1 General Responsibilities. Each renter or lessor or lessee shall comply with the requirements of the applicable section or sections below.

11.1.1 Lessor or Lessee as Dealer or Installer. When a lessor or lessee uses the aerial device as a dealer or installer he shall have the same responsibilities as specified under Section 7 of this standard.

11.1.2 Lessor or Lessee as Owner. When a lessor or lessee uses the aerial device as an owner he shall have the same responsibilities as specified under Section 8 of this standard.

11.1.3 Lessor or Lessee as User. When a lessor or lessee uses the aerial device as a user he shall have the same responsibilities as specified under Section 9 of this standard.

11.1.4 Lessor or Lessee as Operator. When a lessor or lessee uses the aerial device as an operator he shall have the same responsibilities as specified under Section 10 of this standard.

11.2 Ownership Duties. The renter or lessor shall carry out the duties of ownership specified in this standard which are not assigned to the renting entity or lessee as the user.

11.3 Obligations. Upon delivery each renter or lessor of an aerial device shall provide the operators manual and the ANSI/SIA A92.2-xxxx Manual of Responsibilities for dealers, owners, users, operators, lessors and lessees of Vehicle Mounted Elevating and Rotating Aerial Devices. These manuals shall be stored on the mobile unit.

11.4 Training. The renter or lessor shall offer training or training materials that aid the renting entity or lessee in the operation, inspection, testing and maintenance of the aerial device. This training shall be offered initially and subsequently on request.

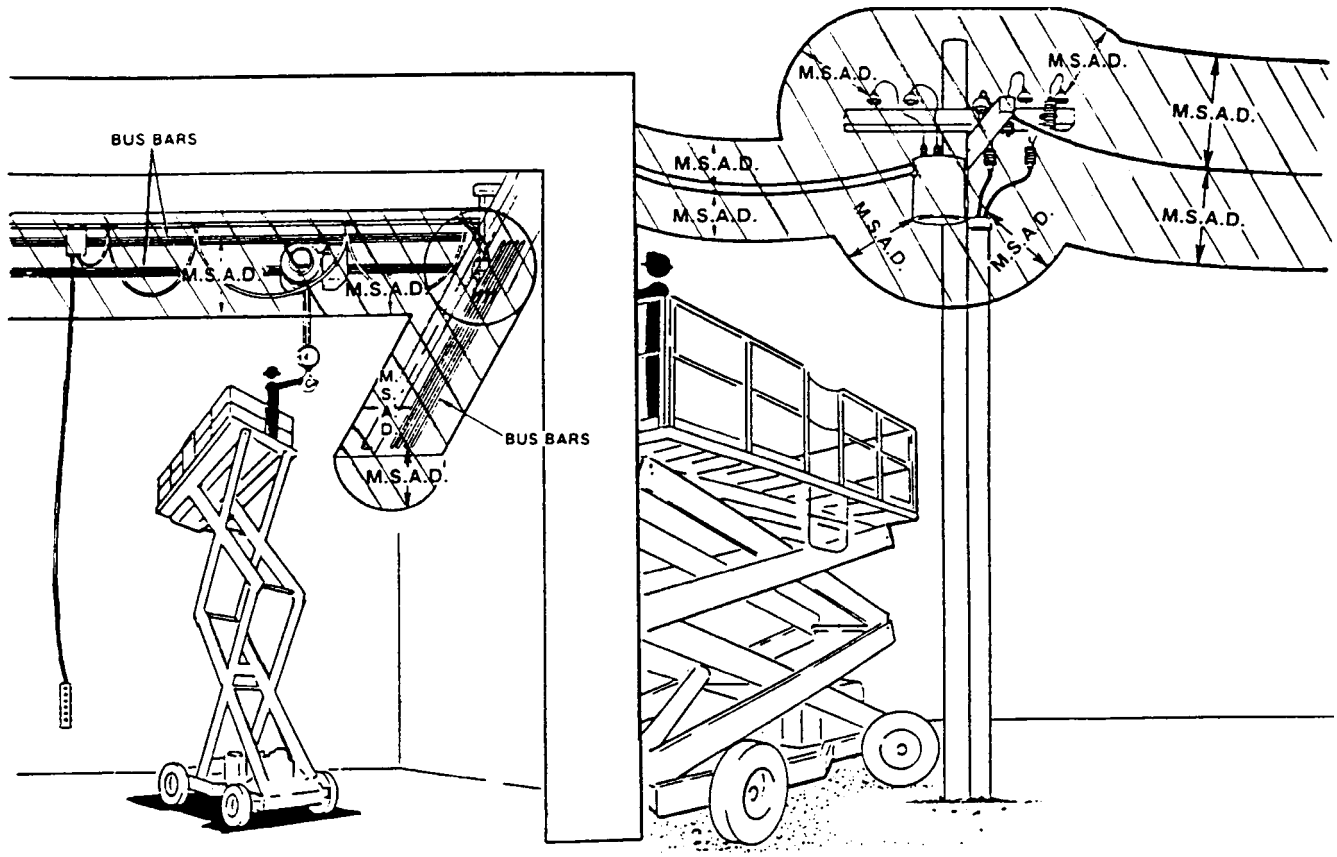
11.4.1 General training. Only personnel who have received general instructions regarding the inspection, application and operation of aerial devices, including recognition and avoidance of hazards associated with their operation, shall operate an aerial device. Such items covered shall include, but not necessarily be limited to, the following issues and requirements:

(1) The purpose and use of manuals.
(2) That operating manuals are an integral part of the aerial device and must be properly stored on the vehicle when not in use.
(3) A pre-start inspection.
(4) Responsibilities associated with problems or malfunctions affecting the operation of the aerial device.
(5) Factors affecting stability.
(6) The purpose of placards and decals.
(7) Workplace inspection.
(8) Applicable safety rules and regulations, such as Part 4, ANSI C2-1997, National Electrical Safety Code (applies to utility workers as defined in ANSI C2). The above standard is an example; other industries using aerial devices have safety rules pertinent to that industry.
(9) Authorization to operate.
(10) Operator warnings and instructions.
(11) Actual operation of the aerial device. Under the direction of a qualified person, the trainee shall operate the aerial device for a sufficient period of time to demonstrate proficiency in the actual operation of the aerial device.
(12) Proper use of personal fall protection equipment

11.4.2 Familiarization. When an operator is directed to operate an aerial device he/she is not familiar with, the operator, prior to operating, shall be instructed regarding the following items and issues:

(1) The location of the manuals.
(2) The purpose and function of all controls.
(3) Safety devices and operating characteristics specific to the aerial device.

11.5 Communications. In the event the manufacturer or installer provides the renter or lessor manuals, bulletins, or other materials for the information of the user of an aerial device, the renter or lessor shall pass them on to the user without any undue delay.



M.S.A.D. = Minimum Safe Approach Distance (See Table 7-1).

DENOTES PROHIBITED ZONE

DANGER

- **Do not allow machine, personnel, or conductive materials inside prohibited zone.**
- **Maintain M.S.A.D. from all energized lines and parts as well as those shown.**
- **Assume all electrical parts and wires are energized unless known otherwise.**

CAUTION

Diagrams shown are only for purposes of illustrating M.S.A.D. work positions, not all work positions.

Table 7-1. Minimum Safe Approach Distance (M.S.A.D.) to energized (exposed or insulated) power lines and parts.

Voltage Range (Phase to Phase)	Minimum Safe Approach Distance	
	(Feet)	(Meters)
0 to 300V	Avoid Contact	
Over 300V to 50KV	10	3.05
Over 50KV to 200KV	15	4.60
Over 200KV to 350KV	20	6.10
Over 350KV to 500KV	25	7.62
Over 500KV to 750KV	35	10.67
Over 750KV to 1000KV	45	13.72

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