



Heavy-Duty Tiller



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1. Purpose of Manual

The information in this manual is for the operation and maintenance of Pierce aerial vehicles. It is intended to serve as a guide to assist qualified drivers and mechanics in the operation and maintenance of their vehicle.

Keep this manual with the vehicle at all times.

NOTE: Some of the details of your vehicle's design and construction may be unique to your department alone. For this reason, information contained in this manual may be generic at times. Questions on major inconsistencies between your vehicle's configuration and the information contained in this manual should be directed to your Pierce Dealer or Sales Representative.

2. Scope

This operator's manual provides operating and maintenance instructions for vehicles manufactured by Pierce Manufacturing Inc.

This manual provides information under the following headings:

Safety. Contains important safety information, requirements before placing a vehicle in service, and information on installing custom equipment and accessories.

General. Includes equipment identification, location and description of major components.

Operation. Contains procedures on normal equipment operation and special operating procedures.

Maintenance. Contains scheduled maintenance and lubrication information.

To order a replacement manual or replacement safety warning labels, call Pierce Manufacturing Inc. at 1-888-974-3723.

3. Customer Assistance Information

Your satisfaction with your Pierce apparatus is important to your dealer and Pierce Manufacturing Inc. Normally, any question or concern you may have with your apparatus can be handled by your selling or servicing dealer. Your dealer has the facility, trained technicians, special tools, and up-to-date information to promptly address any issue that may arise. Pierce Manufacturing Inc. has empowered dealers to make decisions and repair vehicles, and they are eager to resolve your issues to your complete satisfaction. Should you encounter an issue with your Pierce apparatus that requires service, take the following steps:

Step 1.) Contact your authorized Pierce selling or servicing dealer. They will make the necessary arrangements to order the necessary parts and make the required repairs.

Step 2.) If they are not able to repair the problem to your satisfaction, discuss your concern with a member of dealer management. Normally, concerns can be quickly resolved at that level. If the matter has already been reviewed with the Sales, Service, or Parts Manager, contact the owner of the dealership or the General Manager.

Step 3.) If, after contacting a member of the dealership management, it appears your question or concern cannot be resolved by the dealership without further help, you may contact Pierce Manufacturing Inc. at 1-800-YPIERCE.



1-1. Introduction

1-1.1 To the Owner—Operation and Maintenance of this Aerial

The information in this manual is for the operation and maintenance of this aerial. The intent is to instruct operators in the proper operation of this equipment and to warn of improper procedures and potentially dangerous situations.

Only personnel who are totally familiar with this manual and have training are qualified to operate this aerial. It is the responsibility of the department owning this equipment to permit only qualified personnel to operate this aerial.

Pierce Manufacturing Inc. provides the services of a delivery technician before the unit is placed into service to train the department's personnel in the safe and proper method of operation. The name of each trainee is recorded as proof of participation in the training. It is the department's responsibility to provide future training and qualification documentation, and to qualify its operators.

Qualified drivers of other fire apparatus will require further training for the handling of this aerial.

1-1.2 Description of "DANGER," "WARNING," and "CAUTION"



THIS SAFETY SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL.

WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS THIS SYMBOL.

BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.

Warning labels located on the vehicle and warning statements contained in this manual all use the same terminology to warn of potential hazards. Each of these potentially harmful conditions is described below:



A hazard that will result in death or serious personal injury.



A hazard which might result in death or serious personal injury.



A hazard which might result in personal injury or damage to property or equipment.

The "signal words" of **DANGER**, **WARNING**, and **CAUTION** have specific meanings to alert you to the relative level or probability of the hazard.

Take the safety warnings seriously. If you do not understand them or have questions about them, contact Pierce Manufacturing Inc.

1-2. List of Abbreviations

Term	Definition
CFM	Cubic Feet per Minute
CZIC	Command Zone Information Center
ECU	Electronic Control Unit
EPU	Emergency Power Unit
FT	Feet
GAL	Gallons
GPM	Gallons Per Minute
I/O	Input/Output
IN	Inches
ISO	International Organization for Standardization
LB	Pound
MPH	Miles Per Hour
NFPA	National Fire Protection Association
NHTSA	National Highway Traffic Safety Administration
OEM	Original Equipment Manufacturer
PSI	Pounds per Square Inch
PTO	Power Take-Off
SAE	Society of Automotive Engineers
SUS	Saybolt Universal Second

1-3. Before Placing the Aerial in Service

1-3.1 Hydraulic Oil Analysis

Pierce Manufacturing Inc. recommends taking a hydraulic oil sample and having it analyzed before putting the aerial in service. This analysis serves as a baseline for future oil sample analyses taken at subsequent maintenance inspections. Comparing results with the original oil test data will help determine the condition and requirement for additional filtering or fluid replacement. The minimum analysis should include spectrochemical, particle count, viscosity, and water content. The oil sample should be taken from the petcock valve located under the hydraulic oil reservoir, after the oil has warmed to normal system temperature (115°F or higher).

1-3.2 Inspecting the Aerial

Before the aerial is put into service, a primary inspection should be performed. The primary inspection is part of the preventive maintenance forms provided with your new truck. The reason for this inspection is to check for proper operation and adjustment of components, along with cleaning and lubrication, after initial training use and delivery travel.

The operators of the aerial should also become familiar with the inspection process. Their knowledge of a properly adjusted and maintained aerial could prevent a failure or accident by something that has become loose or damaged.

1-4. Customer-Installed Equipment

1-4.1 Drilling Holes or Welding

The drilling of holes or welding to any structural components of the aerial is not permitted. Non-structural sheet metal components may be modified. If in doubt, contact Pierce Manufacturing Inc. for approval and assistance. Pierce Manufacturing Inc. is not responsible for structural failures or corrosion caused by unauthorized modifications to the aerial device.

1-4.2 Dissimilar Metals

Consider the type of metal for the application whenever mounting accessories. Dissimilar metals such as aluminum, steel, stainless steel, brass, etc., when placed in direct contact with each other and subjected to moisture can form a galvanic reaction leading to rapid corrosion and possible failure of the mounting, fastener, or base materials. Select mounting material and fasteners to avoid dissimilar metals, or coat all mounting surfaces, base materials and fasteners with a commercial grade rust-proofing agent (such as those conforming to MIL-C-0083933A specification).

1-4.3 Ladder-Mounted Equipment

Aerial mounted axes, ladders, pike poles, hose boxes, etc., must be mounted securely to withstand road travel and extreme aerial operating conditions.

1-5. Safety Information

1-5.1 Safety Inspection of the Aerial Before Operating

The operator is responsible for knowing the condition of the aerial device before operation. This should include a quick visual scan of (but not limited to) pins, cables, hydraulic cylinders, loose equipment, etc.

1-5.2 Safety Warning Labels and Decals

The following tags and labels are placed on the aerial and body to warn of potentially hazardous situations. Read and understand all labels before operating the aerial. Any lost or damaged labels must be replaced immediately.

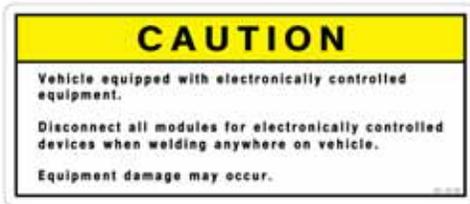
Figure 1-1: Safety Warnings Labels and Decals



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91-0115-002



91-0132



91-0262



95-1585



91-0318



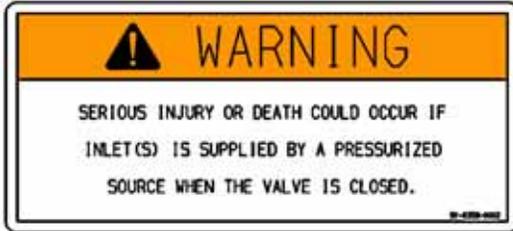
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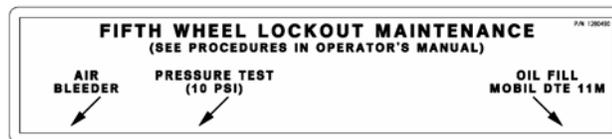
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⚠ WARNING

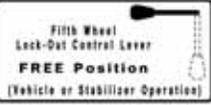
Fifth Wheel Manual Lock-Out System: LOCKED Position.

- Lock fifth wheel after stabilizers deployed and firm on ground.
- Do not free fifth wheel until aerial is bedded.
- Do not adjust stabilizers after fifth wheel locked.
- Aerial device may become unstable if operated without fifth wheel locked.

Fifth Wheel Manual Lock-Out System: FREE Position.

- Free fifth wheel before moving vehicle.
- Vehicle handling will be compromised if vehicle moved with fifth wheel locked.

Death or serious injury may occur.
Refer to operator's manual for more information.



Fifth Wheel Lock-Out Control Lever
FREE Position
(Vehicle or Stabilizer Operation)



Fifth Wheel Lock-Out Control Lever
LOCKED Position
(Aerial Operation)

1338104

⚠ WARNING

Fifth Wheel Manual Lock-Out System: LOCKED Position.

- Lock fifth wheel after stabilizers deployed and firm on ground.
- Do not free fifth wheel until aerial is bedded.
- Do not adjust stabilizers after fifth wheel locked.
- Aerial device may become unstable if operated without fifth wheel locked.

Fifth Wheel Manual Lock-Out System: FREE Position.

- Free fifth wheel before moving vehicle.
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Death or serious injury may occur.
Refer to operator's manual for more information.



Fifth Wheel Lock-Out Control Lever
LOCKED Position
(Aerial Operation)



Fifth Wheel Lock-Out Control Lever
FREE Position
(Vehicle or Stabilizer Operation)

1338106



2-1. Equipment Description, Capabilities and Features

2-1.1 Apparatus Characteristics

The Heavy-Duty Tiller consists of a tractor drawn trailer with a four (4) section 100-foot aerial ladder. Two drivers are required (only if the rear tiller cab steering is NOT locked), one for the front main cab (front steering axle) and one for the rear tiller cab (rear steering axle). Major systems are: Tiller Tractor, Tiller Trailer, Tiller Cab (Rear), Ladder Assembly, Waterway, Turntable, Stabilizers, Hydraulic System, Electrical System, Water System, Pump House, Foam System, and the Emergency Power System.

2-1.2 Ladder Assembly

The four-section steel ladder will extend to a height of 100 feet above ground at 75°. The tip of the aerial has a 500 lb capacity at full extension, with a 50-mph wind and discharging up to 1000 gpm at 100 psi and with the nozzle in any position.

Extension and retraction motion is provided by two hydraulically-powered cylinders and a cable/pulley system.

Elevation motion is generated through two double-acting lift cylinders, giving the ladder the capability of 5° below horizontal to 75° above horizontal.

Rotation motion is provided through an external tooth swing bearing, which is hydraulically driven by a planetary gearbox with a drive speed reducer. There is a rotation interlock system that will prevent the aerial from being rotated to the side on which the stabilizers are not fully deployed (short-jacked).

The ladder is equipped with holding valve cartridges and a rotational brake to restrict ladder movement when system hydraulic pressure is not present.

The ladder is constructed to meet the requirements as described in NFPA 1901–1999. The ladder has a safety factor of 2 to 1 (2:1) based on the rated load and a stability factor of 1-1/2 to 1 (1.5:1). Each ladder section is trussed diagonally, vertically, and horizontally using welded steel tubing.

2-1.3 Turntable Deck

The turntable deck has a non-skid surface. The turntable is illuminated by work lights that are activated by the aerial master switch.

2-1.4 Stabilizers

Two extendible, double box design stabilizers are provided for stability. The stabilizers include extension cylinders to extend and retract the stabilizers and jack cylinders to raise and lower the stabilizers. The extension cylinders are equipped with internal holding valves and internal decelerators to cushion the cylinder speed when near the fully extended and retracted positions. The jack cylinders are equipped with integral holding valves that will hold the cylinder in place should a hydraulic line become severed.

Stabilizer electric controls are located on each side of the apparatus so the operator has full view of the stabilizer being positioned. Stabilizer manual override controls are also provided.

A stabilizer deployment warning (beeper) alarm is located on each side and is activated when stabilizers are in motion. The warning alarm will deactivate when all the stabilizers are in the load support position.

A "Stabilizers Not Stowed" indicator light, located in the driver's compartment, illuminates automatically when the stabilizers are not fully stowed.

2-1.5 Lower Control Station

There is a lower control station located on both the driver and passenger sides of the apparatus that is easily accessible with all controls and indicators clearly identified. Each lower control station contains the following:

- Stabilizer controls for driver and passenger side
- Stabilizer beam In/Out switch and indicator light;
- Stabilizer jack Up/Down switch and indicator light;
- Inclinometer for grade and slope
- Emergency hydraulic power switch;
- High idle switch (for maximum hydraulic output rpm);

2-1.6 Turntable Control Console

The turntable control console is located on the right-hand side of the turntable facing the ladder tip with all controls and indicators clearly identified. The console is illuminated for nighttime operation. The ladder function controls can be used, started, or stopped individually or together with minimal effect of the movement speed of the other controls. The turntable control console includes the following:

- Elevation, extension, and rotation controls
- High idle switch
- Tip/Tracking lights
- Load chart
- Water flow gauge
- Monitor controls
- Emergency Pump Unit (EPU) switch
- Intercom
- Hydraulic pressure gauge
- Indicator alarm/test switch
- "Stabilizer Not Fully Extended" indicator light
- Rung alignment indicator light
- Remote aerial control activation switch

2-1.7 Aerial Waterway

The telescoping waterway consists of a 4.5-inch diameter tube in the base section, a 4.0-inch tube in the lower mid-section, a 3.5-inch tube in the upper mid-section, and a 3.0-inch tube in the fly section. The aerial is capable of discharging 1000 gpm at 100 psi parallel to the ladder and 90° to each side of center. An adjustable pressure relief valve is installed to protect the waterway from an excessive pressure surge. The waterway is constructed of anodized aluminum tubing. Two 1.5-inch drains are located at the lowest point of the waterway.

The waterway seals are a type-B PolyPak design. They will withstand pressures up to 2000 psi and temperatures in excess of 250°. The seals have resistance to all foam-generating solutions and are internally lubricated.

An optional Quick-Lock® waterway monitor is capable of being positioned at the fly section or the upper mid-section.

2-1.8 Communication System

An Atkinson intercom system (*optional*) is installed between the tip of the ladder and the turntable console. A master control is located at the turntable, with a push-to-talk button and volume control. A self-contained "hands-off" speaker/microphone is located at the tip of the ladder.

A Sigtronics intercom system (*optional*) is installed in the main cab that controls the headsets used between the crew members.

There also is an audible alarm (buzzer) that is activated when the switch is pressed in either the Tractor or Tiller cab. Normal signals include 1 beep = STOP, 2 beeps = GO, 3 beeps = BACK UP.

2-1.9 Electrical Swivel

The aerial is equipped with an electrical swivel with 28 collector rings (32 collector rings optional), capable of operation through 360°. Each collector ring is capable of handling a 20-amp load.

2-1.10 Emergency Pump Unit (EPU)

The Heavy-Duty Tiller has an Emergency Pump Unit (EPU) that operates off of the truck batteries. The EPU is used for limited ladder functions to stow the aerial in case of primary pump failure. The EPU can operate continuously for up to thirty (30) minutes.

2-1.11 Tiller Cab

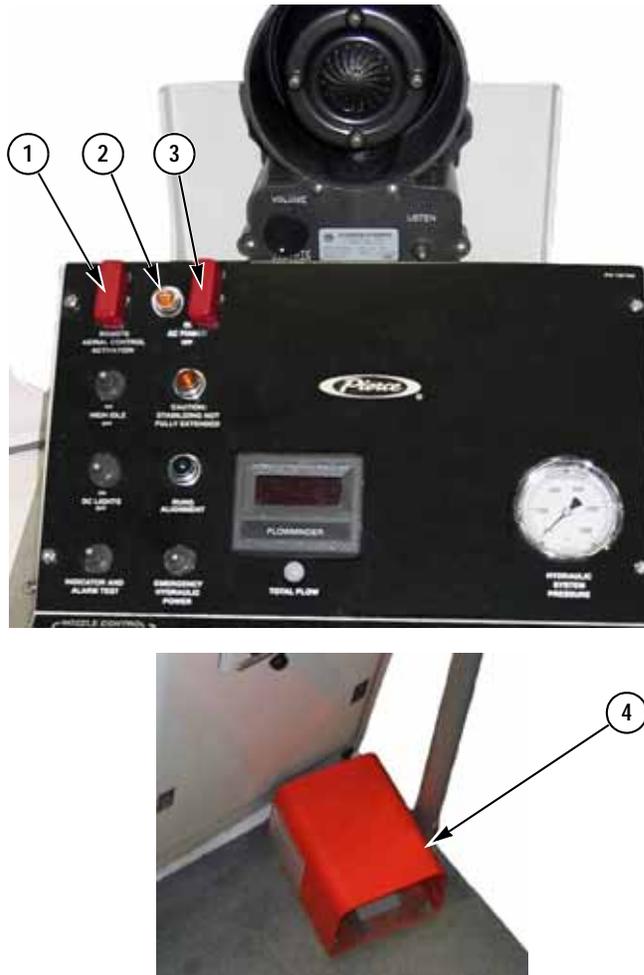
The Heavy-Duty Tiller has a second cab located at the rear of the aerial ladder on the tiller trailer. The tiller cab is totally enclosed and contains:

- Steering controls for the tiller tractor (rear steer)
- Communication (intercom) system and a foot-operated buzzer signaling system to the front main cab
- Heating and air conditioning system
- Two-speed electric windshield wiper with washer
- Jackknife alarm
- Tiller wheel position indicator gauge (L-C-R)
- Diagnostic plug for the tiller trailer Anti-lock Brake System (ABS)
- Starter continuity safety footswitch
- Steering lock that enables the tiller to be driven without a tiller cab operator

2-2. Location and Description of Major Components

2-2.1 Turntable Controls

Figure 2-1: Turntable Controls



1084, 1085

Item # Description and Function

1. **REMOTE AERIAL CONTROL ACTIVATION SWITCH.** Allows the aerial to be operated with the remote control.
2. **AC POWER INDICATOR LIGHT.** When lit, indicates that the AC power switch is turned on.
3. **AC POWER ON/OFF SWITCH.** Turns the 120-volt AC power generator circuit ON or OFF.
4. **AERIAL DEADMAN FOOT SWITCH.** This safety switch must be depressed for the ladder controls to operate.

2-2.1 Turntable Controls (*Continued*)

Figure 2-2: Turntable Controls



1084

Item # Description and Function

5. **STABILIZERS NOT FULLY EXTENDED INDICATOR.** When lit, indicates when one (or more) of the stabilizers is not in the fully extended position.
6. **RUNG ALIGNMENT INDICATOR.** When illuminated, indicates that the overlapping ladder sections have their rungs in alignment for climbing.

- NOTE:**
- The EPU should be used only when the main system hydraulic pump is not operating.
 - The EPU has a limited run time before possible overheating. DO NOT run the EPU for more than 30-minutes without allowing at least 30 minutes for cooling down. Limiting loads and pressures will allow for more efficient use of the EPU and will also generate less heat.
 - The EPU should only be activated after the desired function is selected.
 - If the electronic system has failed and the manual aerial or stabilizer controls are being used, the EPU switch located at the manual stabilizer controls will be the only one active.

7. **EMERGENCY HYDRAULIC POWER SWITCH (Aerial Controls).** Activates the secondary hydraulic system (EPU). The proper sequence is to activate the desired function, then place the EPU switch in its ON position until the operation is complete, then release the switch before returning the manual control handle to the neutral position.

2-2.1 Turntable Controls (*Continued*)

Figure 2-3: Turntable Controls



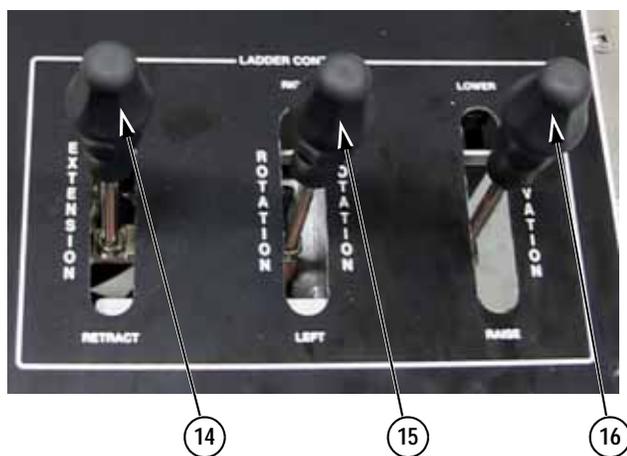
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Item #	Description and Function
--------	--------------------------

- | | |
|-----|--|
| 8. | HIGH IDLE SWITCH. When activated, energizes the engine high idle circuit to take the engine to a preset rpm. |
| 9. | TIP TRACKING LIGHTS SWITCH (12-Volt). When activated, switch energizes the two spot lights located on each side of the ladder tip and the lower tracking lights. |
| 10. | INDICATOR AND ALARM TEST SWITCH. When activated, momentarily activates all indicator lights and alarms. |
| 11. | WATER FLOW GAUGE DISPLAY SELECTOR BUTTON. When pressed, it changes the water flow gauge display from gallons per minute (gpm) to total gallons consumed. |
| 12. | WATER FLOW GAUGE. Indicates the current gallons per minute (gpm) water flow and/or the total gallons consumed. |
| 13. | HYDRAULIC SYSTEM PRESSURE GAUGE. This gauge indicates the hydraulic pressure available to operate the aerial. The system standby (bias) pressure is 350 psi (+/-10 psi). The maximum system pressure is 3000 psi. |

2-2.2 Ladder Controls (*Turntable*)

Figure 2-4: Turntable Ladder Controls



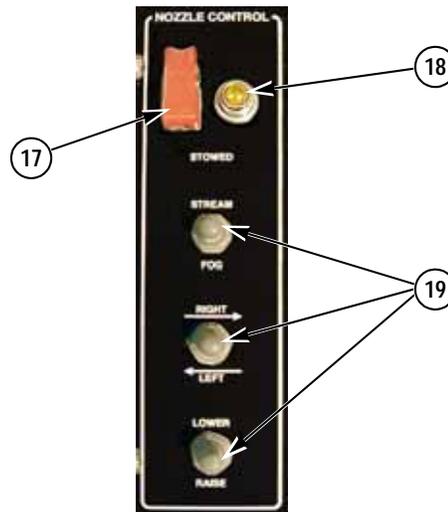
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Item # Description and Function

14. **EXTENSION/RETRACTION CONTROL LEVER.** Depress the deadman foot switch to activate hydraulic controls. Pull back on lever to retract the boom. Push forward on the lever to extend the boom. When the lever is released, it will return to the neutral or center position.
15. **BOOM ROTATION CONTROL LEVER.** Depress the deadman foot switch to activate hydraulic controls. Pull back on the lever to move the boom counterclockwise (to the left). Push forward on the lever to move the boom clockwise (to the right). When the lever is released, it will return to the neutral or center position.
16. **RAISE/LOWER CONTROL LEVER.** Depress the deadman foot switch to activate hydraulic controls. Pull back on the lever to raise (elevate) the boom. Push forward on the lever to lower the boom. When the lever is released, it will return to the neutral or center position.

2-2.2 Ladder Controls (*Turntable*) (*Continued*)

Figure 2-5: Turntable Ladder Controls



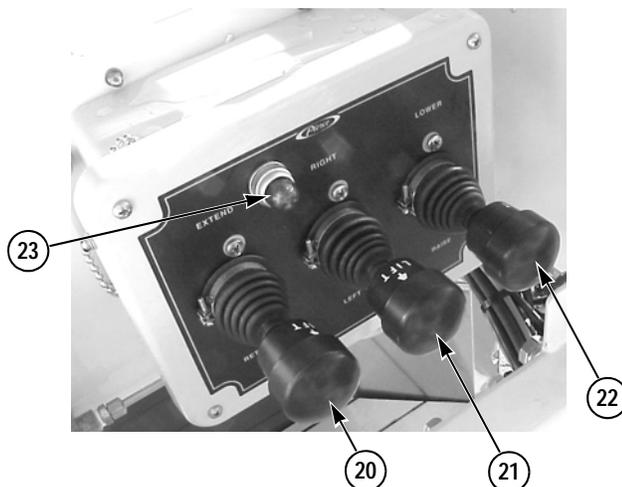
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Item # Description and Function

17. **MONITOR DEPLOY AND STOW CONTROL SWITCH.** Used to position the monitor. Lift cover and move switch forward to deploy monitor. Lift cover and move switch back to stow monitor.
18. **MONITOR STOWED/FAULT INDICATOR.** When indicator remains lit, the monitor is fully stowed. The indicator goes out whenever the monitor is moved from the stowed position. The indicator also goes out when the aerial is stowed in the cradle. Indicator also flashes for specific faults.
19. **NOZZLE CONTROL SWITCHES.** Used to control the operation of the water monitor:
 - a. STREAM/FOG—push up for stream; push down for fog.
 - b. LEFT/RIGHT—push right to move the nozzle right; push left to move the nozzle left.
 - c. LOWER/RAISE—push up to move the nozzle down; push down to move the nozzle up.

2-2.3 Ladder Controls (*Tip*)

Figure 2-6: Ladder Controls (*Tip*)



POM0312

Item # Description and Function

20. **EXTEND/RETRACT CONTROL LEVER.** Pull up on the locking collar to unlock lever. Push down on the lever to retract the ladder. Pull up on the lever to extend the ladder. When the lever is released, it will return to the neutral or center position.
21. **LADDER ROTATION CONTROL LEVER.** Pull up on the locking collar to unlock lever. Push down on the lever to move the ladder counter clockwise (to the left). Pull up on the lever to move the ladder clockwise (to the right). When the lever is released, it will return to the neutral or center position.
22. **RAISE/LOWER CONTROL LEVER.** Pull up on the locking collar to unlock lever. Push down on the lever to raise (elevate) the ladder. Pull up on the lever to lower the ladder. When the lever is released, it will return to the neutral or center position.
23. **POWER INDICATOR LIGHT.** When lit, indicates that the turntable operator has energized the ladder tip controls.

2-2.4 Nozzle Controls (*Tip*)Figure 2-7: Nozzle Controls (*Tip*)

POM0313

Item # Description and Function

24. **MONITOR DEPLOY AND STOW CONTROL SWITCH (*OPTIONAL*).** Used to position the monitor. Move switch forward to deploy monitor. Move switch back to stow monitor.
25. **STRAIGHT STREAM (SS)/FOG NOZZLE CONTROL SWITCH.** Allows the operator to select straight stream or discharge pattern. Push the switch up to change to straight stream. Push the switch down to change to fog pattern.
26. **RIGHT/LEFT NOZZLE CONTROL SWITCH.** Used to move the electric monitor to the left and to the right. Move the switch to the right to move the nozzle to the right. Move the switch to the left to move the nozzle to the left.
27. **RAISE/LOWER NOZZLE CONTROL SWITCH.** Used to move the electric monitor up and down. Push the switch up to raise the position of the nozzle. Push the switch down to lower the position of the nozzle.

2-2.5 Intercom (*Tip and Turntable*)

Figure 2-8: Tip and Turntable Intercom



POM0314

Item # Description and Function

- 28. INTERCOM.** The aerial has an intercom system with stations located at the turntable console and the tip. All intercom functions are controlled from the console or pump control panel units. The console station has a volume control to adjust incoming transmissions at the console. Turn knob clockwise to increase intercom volume; turn knob counterclockwise to reduce intercom volume. Press the “press-to-talk” switch to talk to other intercom stations; release to receive communications from other intercom stations. The tip station is hands-free, which means all the operator has to do is talk to be heard at the console.

2-2.6 Stabilizer Controls

Figure 2-9: Stabilizer Controls



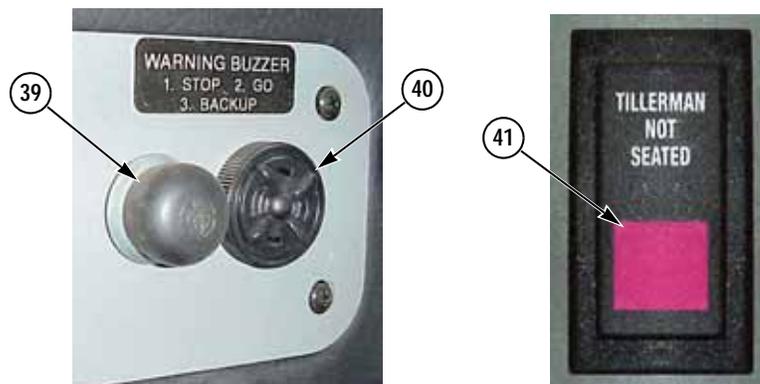
1082

Item # Description and Function

29. **HIGH IDLE SWITCH.** Switch is used to enable the engine high idle circuit.
30. **PASSENGER SIDE STABILIZER BEAM IN/OUT CONTROL.** Controls the operation of the passenger side stabilizer beam. Push switch left to extend the beam; push switch right to retract the beam.
31. **PASSENGER SIDE STABILIZER EXTENDED INDICATOR LIGHT.** When lit, indicates that the stabilizer beam is fully extended.
32. **PASSENGER SIDE STABILIZER DOWN INDICATOR LIGHT.** When lit, indicates that the stabilizer jack is down.
33. **PASSENGER SIDE STABILIZER JACK UP/DOWN CONTROL.** Controls the operation of the passenger side stabilizer jack. Push switch down to lower the jacks; push switch up to raise the jacks.
34. **EMERGENCY PUMP UNIT (EPU) SWITCH.** Switch is used to operate the EPU.
35. **DRIVER SIDE STABILIZER BEAM IN/OUT CONTROL.** Controls the operation of the driver side stabilizer beam. Push switch right to extend the beam; push switch left to retract the beam.
36. **DRIVER SIDE STABILIZER EXTENDED INDICATOR LIGHT.** When lit, indicates that the stabilizer beam is fully extended.
37. **DRIVER SIDE STABILIZER DOWN INDICATOR LIGHT.** When lit, indicates that the stabilizer jack is down.
38. **DRIVER SIDE STABILIZER JACK UP/DOWN CONTROL.** Controls the operation of the driver side stabilizer jack. Push switch down to lower the jacks; push switch up to raise the jacks.

2-2.7 Tractor Cab Controls

Figure 2-10: Tractor Cab Controls

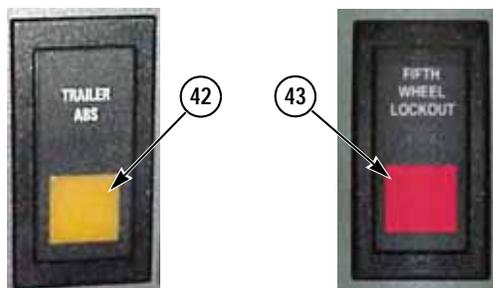


POM0317, 0318

Item # Description and Function

- 39. **TILLER AUDIO ALARM SWITCH.** Press switch to activate an audio alarm (buzzer) to tiller cab.
- 40. **TILLER AUDIO ALARM.** Audible alarm (buzzer) that is activated when the switch is pressed in the tiller cab.
- 41. **TILLERMAN NOT SEATED INDICATOR LIGHT.** When lit, indicates that the tiller operator is NOT seated in the tiller cab seat.

Figure 2-11: Indicator Lights



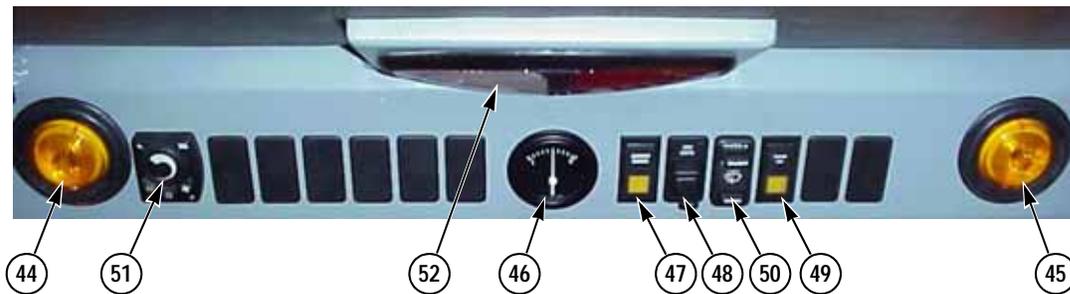
POM0319, 0320

Item # Description and Function

- 42. **TRAILER ANTI-LOCK BRAKE INDICATOR LIGHT.** When lit, indicates that the tiller trailer anti-lock brake system is activated.
- 43. **TILLER TRACTOR FIFTH WHEEL LOCKOUT INDICATOR LIGHT.** When lit, indicates that the tiller tractor fifth wheel is in the "Locked" position for aerial operation. Light must be out for normal driving operations.

2-2.8 Tiller Cab Controls

Figure 2-12: Tiller Cab Controls



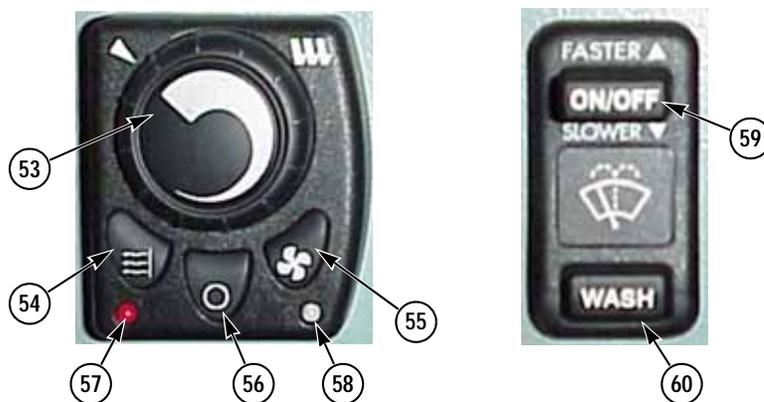
POM0321

Item #	Description and Function
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- | | |
|-----|--|
| 44. | LEFT TURN SIGNAL INDICATOR LIGHT. When lit, indicates that the tiller tractor left turn signal is activated. |
| 45. | RIGHT TURN SIGNAL INDICATOR LIGHT. When lit, indicates that the tiller tractor right turn signal is activated. |
| 46. | REAR WHEEL POSITION INDICATOR GAUGE. Indicates the current tiller trailer wheel direction relative to center. |
| 47. | TILLER TRAILER JACKKNIFE WARNING INDICATOR LIGHT. When lit, indicates the tiller trailer is approaching an angle in which a jackknife situation may occur. |
| 48. | STEP LIGHT SWITCH. Used to turn the tiller trailer cab step lights ON and OFF. |
| 49. | TRAILER ANTI-LOCK BRAKE INDICATOR LIGHT. When lit, it indicates that the tiller trailer anti-lock brake system is activated. |
| 50. | TILLER CAB WINDSHIELD WIPER ON/OFF AND SPEED CONTROL SWITCH. See Figure 2-13 . |
| 51. | TILLER CAB HEATER CONTROL SWITCH. See Figure 2-13 . |
| 52. | TILLER CAB DOME LIGHT. A dome light is provided on the ceiling of the cab and is turned ON and OFF by pressing on the lens. The clear lens is for normal lighting and the red lens is used to reduce driver distraction at night. The clear lens also illuminates when the tiller cab door is opened. |

2-2.8 Tiller Cab Controls (*Continued*)

Figure 2-13: Tiller Cab Controls



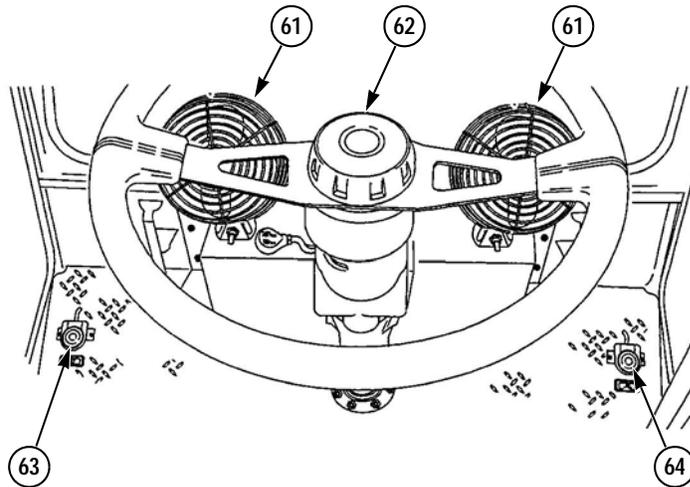
POM0322, 0323

Item #	Description and Function
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- | | |
|-----|--|
| 53. | TILLER CAB HEATER TEMPERATURE CONTROL SWITCH. Turn adjuster clockwise to increase tiller cab heat. Turn adjuster counter-clockwise to decrease tiller cab heat. |
| 54. | TILLER CAB HEATER ON/OFF SWITCH. Push switch to turn tiller cab heat ON and OFF. |
| 55. | TILLER CAB HEATER FAN ON/OFF SWITCH. Push switch to turn tiller cab heater fan ON and OFF. |
| 56. | TILLER CAB HEATER MASTER POWER ON/OFF SWITCH. Push switch to turn tiller cab heat master power switch ON and OFF. |
| 57. | TILLER CAB HEAT (RED LED) INDICATOR LIGHT. When lit, it indicates that the tiller cab heat is ON. |
| 58. | TILLER CAB HEAT MASTER POWER (WHITE LED) INDICATOR LIGHT. When lit, it indicates that the tiller cab heat master power switch ON. |
| 59. | TILLER CAB WINDSHIELD WIPER ON/OFF AND SPEED CONTROL SWITCH. Push switch in and out to turn windshield wipers ON and OFF. Push switch up to increase windshield wiper speed. Push switch down to decrease windshield wiper speed. |
| 60. | TILLER CAB WINDSHIELD WASHER SWITCH. Push switch in to spray windshield washer fluid on tiller cab windshield. |

2-2.8 Tiller Cab Controls (*Continued*)

Figure 2-14: Tiller Cab Controls



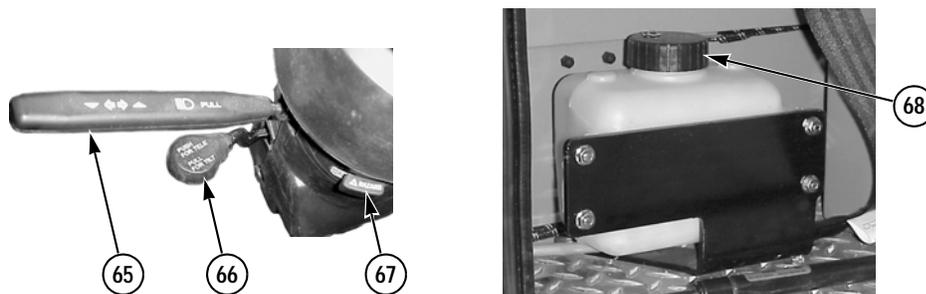
POM0324

Item # Description and Function

61. **TWO WINDOW DEFROST FANS.** The defrost fans can be positioned as desired to keep the interior windshield clear from fog.
62. **STEERING WHEEL HORN BUTTON.** The steering wheel horn button activates the same communication alarm as the foot switch.
63. **START INTERLOCK FOOT SWITCH (Left side on floor).** Tiller Tractor starting motor will not engage until the Tiller Trailer operator is seated in Tiller Trailer cab and the start interlock foot switch is depressed.
64. **SIGNAL BUZZER FOOT SWITCH (Optional) (Right side on floor).** A foot switch that activates an alarm in the tiller tractor is mounted on the floor. This provides both drivers with a secondary “non-voice” means of communication.

2-2.8 Tiller Cab Controls (*Continued*)

Figure 2-15: Tiller Cab Controls



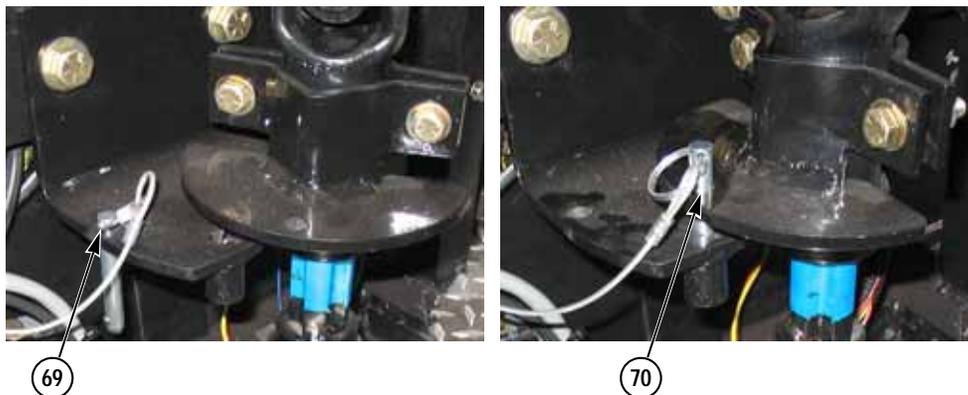
POM0325, 0326

Item # Description and Function

- 65. **TILLER CAB TURN SIGNAL AND HIGH/LOW BEAM LIGHT SWITCH.** Pull lever toward you to activate cornering light. Pull lever toward you again to deactivate cornering light.
- 66. **TILLER CAB STEERING COLUMN ADJUSTMENT LEVER.** Push lever to telescope steering wheel IN and OUT. Pull lever to tilt steering column FRONT and BACK.
- 67. **TILLER CAB HAZARD LIGHT SWITCH.** Pull button out to turn ON tiller 4-way hazard marker lights. Push button in to turn OFF tiller 4-way hazard marker lights.
- 68. **TILLER CAB WINDSHIELD WASHER FLUID FILL.** Supplies tiller trailer cab with windshield washer fluid.

2-2.8 Tiller Cab Controls (*Continued*)

Figure 2-16: Tiller Cab Controls



POM0379, 0380

The Heavy-Duty Tiller Cab has a steering column lock which enables the apparatus to be driven by only one driver in the front main cab.

Item # Description and Function**⚠ DANGER**

The steering lock pin must be stowed properly in the correct location. Failure to do so could cause loss of steering control.

69. **STEERING COLUMN LOCK PIN (UNLOCKED POSITION).** The tiller steering lock pin is stowed as shown in the storage hole on the stationary portion of the steering lock assembly. The storage hole is located to clear the moving disc portion of the steering lock assembly, which is attached to the steering shaft.

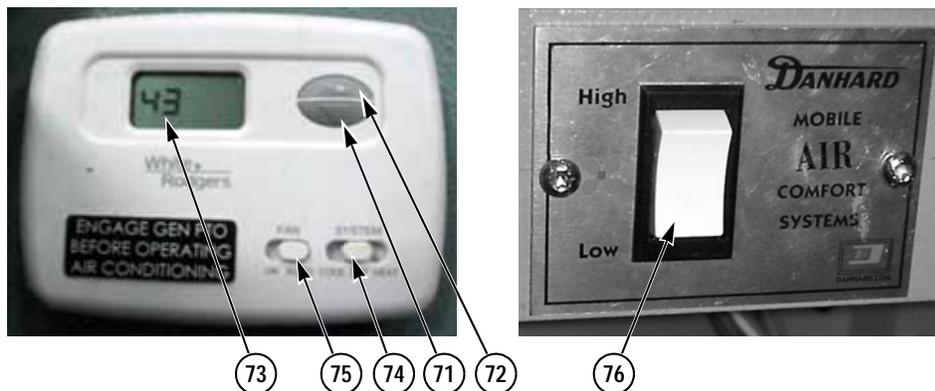
⚠ DANGER

To lock the steering column, the steering lock pin must be fully inserted through both plates of the steering lock assembly. Failure to do so could cause the steering lock to release unexpectedly.

70. **STEERING COLUMN LOCK PIN (LOCKED POSITION).** To lock the trailer axle in the straight-ahead position (0° turn angle), align the hole in the moving disc (attached to the steering shaft) with the hole located in the stationary portion of the steering lock assembly (may require an assistant to verify tire position). Insert the steering lock pin into the locking hole as shown. The pin should be inserted fully through both the stationary plate and the moving disc portion of the steering lock assembly.

2-2.8 Tiller Cab Controls (*Continued*)

Figure 2-17: Tiller Cab Controls

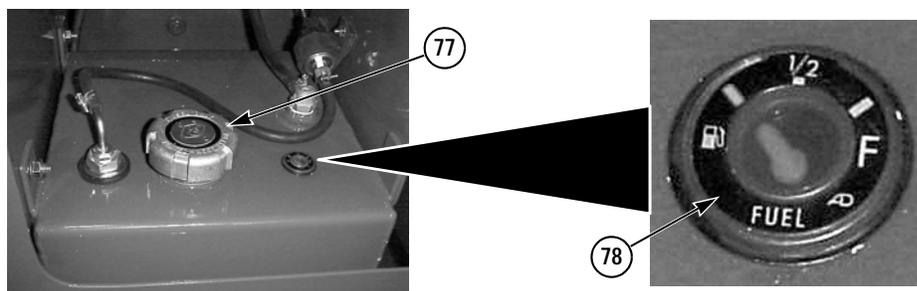


1091, POM0327

Item # Description and Function

- 71. **TILLER CAB A/C TEMPERATURE COOLER SWITCH.** Push button to lower temperature setting.
- 72. **TILLER CAB A/C TEMPERATURE WARMER SWITCH.** Push button to raise temperature setting.
- 73. **TILLER CAB THERMOSTAT DISPLAY.** Displays current temperature and temperature selection.
- 74. **TILLER CAB COOL-OFF-HEAT SWITCH.** Turns A/C ON and switches between cooling and heating modes.
- 75. **TILLER CAB FAN AUTOMATIC OR MANUAL SWITCH.** Allows fan speed to be adjusted automatically or manually.
- 76. **TILLER CAB A/C FAN SPEED SWITCH.** When A/C system is in manual mode, switches fan speed to either HIGH or LOW.

Figure 2-18: Tiller Cab Controls



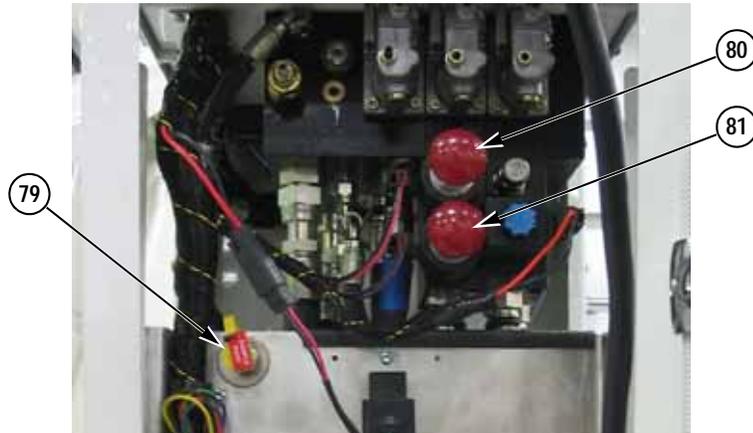
POM0330, 0331

Item # Description and Function

- 77. **TILLER CAB HEATER FUEL FILL.** Supplies tiller trailer cab heater with fuel (diesel fuel only).
- 78. **TILLER CAB HEATER FUEL LEVEL GAUGE.** Shows level of diesel fuel in cab heater fuel tank.

2-2.9 Manual Aerial Override Controls and Pressure Test Ports

Figure 2-19: Manual Aerial Override Controls and Pressure Test Ports



1086

Item # Description and Function

- 79. **LOAD SENSE (LST) Test Port.** This test port has a yellow cap and is also used for an oil sampling port.
- 80. **BOOM COUNTERCLOCKWISE ROTATION EMERGENCY OVERRIDE KNOB.** Used in the event of the loss of aerial electric power. Boom counterclockwise hydraulic power can be obtained by pulling and holding this knob.

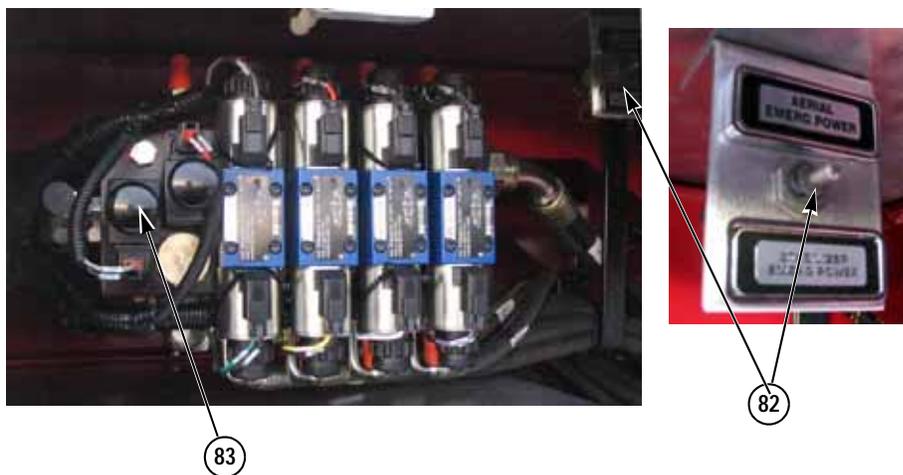
⚠ DANGER

Activating the boom clockwise rotation emergency override will disable the rotation interlock for short jacking.

- 81. **BOOM CLOCKWISE ROTATION EMERGENCY OVERRIDE KNOB.** Used in the event of the loss of aerial electric power. Boom clockwise hydraulic power can be obtained by pulling and holding this knob.

2-2.9 Manual Aerial Override Controls and Pressure Test Ports (Continued)

Figure 2-20: Manual Aerial Override Controls and Pressure Test Ports



1089, 1090

- NOTE:**
- The EPU should be used only when the main system hydraulic pump is not operating.
 - The EPU has a limited run time before possible overheating. DO NOT run the EPU for more than 30 minutes without allowing at least 30 minutes for cooling down. Limiting loads and pressures will allow for more efficient use of the EPU and will also generate less heat.
 - The EPU should only be activated after the desired function is selected.
 - If the electronic system has failed and the manual aerial or stabilizer controls are being used, the EPU switch located at the manual stabilizer controls will be the only one active.

Item # Description and Function

- 82. EMERGENCY PUMP UNIT (EPU) SWITCH.** UP for aerial emergency power, and DOWN for stabilizer power). Activates the secondary hydraulic system. The proper sequence is to activate the desired function, then place the EPU switch in its ON position until the operation is complete, then release the switch before returning the manual control handle to the neutral position.

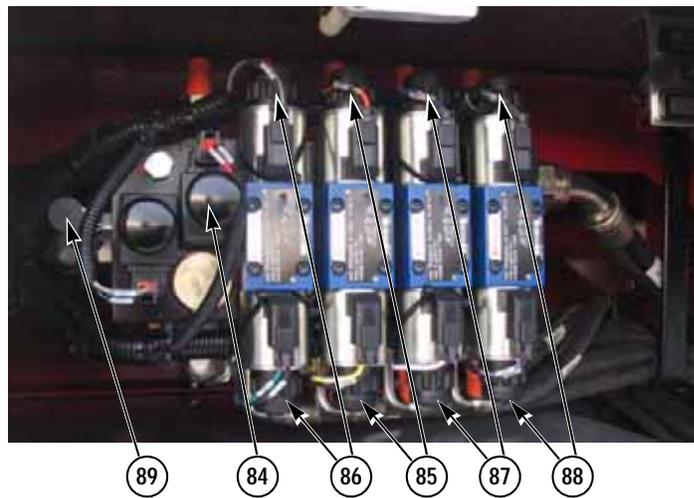
⚠ DANGER

Activating the aerial emergency override will disable the aerial interlock system.

- 83. AERIAL EMERGENCY OVERRIDE KNOB.** Used in the event of the loss of aerial electric power. Aerial hydraulic power can be obtained by pulling and holding this knob.

2-2.9 Manual Aerial Override Controls and Pressure Test Ports (*Continued*)

Figure 2-21: Manual Aerial Override Controls and Pressure Test Ports



1090

⚠ DANGER

Activating the stabilizer emergency override will disable the stabilizer interlock system.

Item # Description and Function

- 84. **STABILIZER EMERGENCY OVERRIDE KNOB.** Used in the event of the loss of aerial electric power. Stabilizer hydraulic power can be obtained by pulling and holding this knob.
- 85. **DRIVER SIDE STABILIZER JACK CYLINDER MANUAL OVERRIDE CONTROL.** Manually controls the operation of the driver side stabilizer jack cylinder.
- 86. **DRIVER SIDE STABILIZER BEAM MANUAL OVERRIDE CONTROL.** Manually controls the operation of the driver side stabilizer beam cylinder.
- 87. **PASSENGER SIDE STABILIZER JACK CYLINDER MANUAL OVERRIDE CONTROL.** Manually controls the operation of the passenger side stabilizer jack cylinder.
- 88. **PASSENGER SIDE STABILIZER BEAM MANUAL OVERRIDE CONTROL.** Manually controls the operation of the passenger side stabilizer beam cylinder.
- 89. **MAIN HYDRAULIC PRESSURE TEST PORT.**

2-3. Load Chart Information

⚠ DANGER

- Do not exceed load limits.
- Do not attempt to operate the apparatus unless you have had proper training and read and understand the operator's manual.
- Serious injury or death may occur.

NOTE: Capable of unlimited monitor nozzle positions while flowing 1000 gpm.

Table 2-1: Standard Load Chart

Waterway Dry and 50 mph Wind Condition								
Degree of Elevation	-5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 75
Egress	500	500	500	500	500	500	500	500
Fly	—	—	—	—	250	250	750	1000
Upper Mid	—	—	—	250	250	500	1000	1000
Lower Mid	—	—	250	250	500	750	1000	1000
Base	—	250	500	500	750	1000	1000	1000

Waterway Charged and 50 mph Wind Condition								
Degree of Elevation	-5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 75
Egress	500	500	500	500	500	500	500	500
Fly	—	—	—	—	—	250	500	750
Upper Mid	—	—	—	—	250	500	750	1000
Lower Mid	—	—	—	250	500	750	1000	1000
Base	—	—	250	500	750	1000	1000	1000

Reduced loads at the tip can be redistributed in 250-lb increments to the fly, mid-sections, or base sections as needed.

Capacities are based on the following conditions:

- Apparatus is set up according to the operator's manual and leveled to within safe operating limits.
- The ladder is fully extended and unsupported, 360° continuous rotation.
- For icing conditions, refer to separate load chart in this operator's manual.

Rated:

Vertical height: 100 ft
 Horizontal reach: 0° = 94 ft 5 in.
 45° = 65 ft 8 in.
 75° = 22 ft 2 in.

⚠ DANGER

- Operating an aerial device with ice build up is very dangerous. Extreme caution must be used to prevent overloading of the aerial device.
- Capacities shown on the Ice Condition load chart are based on a uniform coating of ice on the exposed surfaces. The operator must be aware of the condition of the aerial. Large build ups of ice near the tip can rapidly lead to an unstable condition.
- Do not exceed load limits.
- Do not attempt to operate the apparatus unless you have had proper training and read and understand the operator’s manual.
- Serious injury or death may occur.

- NOTE:**
- The following capabilities shall be based upon continuous 360° rotation and aerial at any extension with 0.25 in. of ice build-up.
 - Capable of unlimited monitor nozzle positions while flowing 1000 gpm.

Table 2-2: Ice Condition Load Chart

Waterway Dry and 50 mph Wind Condition								
Degree of Elevation	-5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 75
Egress	450	500	500	500	500	500	500	500
Fly	—	—	—	—	—	250	750	1000
Upper Mid	—	—	—	—	250	500	1000	1000
Lower Mid	—	—	—	250	500	750	1000	1000
Base	—	—	250	500	750	1000	1000	1000

Waterway Charged and 50 mph Wind Condition								
Degree of Elevation	-5 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 75
Egress	250	300	350	500	500	500	500	500
Fly	—	—	—	—	—	—	250	500
Upper Mid	—	—	—	—	—	250	500	750
Lower Mid	—	—	—	—	250	500	750	1000
Base	—	—	—	250	500	750	1000	1000



⚠ DANGER

You must not operate this device unless:

- You have been trained in the safe operation of this device.
- You know and follow the safety and operating recommendations contained in the manufacturer's manuals, your employer's work rules and applicable governmental regulations.
- All personnel on the aerial ladder or platform are wearing a safety belt properly attached to the device.
- It is being operated within its rated load capacity.
- All stabilizers are properly deployed on an adequately solid surface.
- It has been visually inspected for defects before operation and use.

Death or serious injury may result if the above precautions are not observed.

3-1. Pre-Driving and Truck Positioning

NOTE: The following procedures are intended for safe operation of the aerial. Deviation from these procedures is not recommended.

3-1.1 Pre-Driving Checks

- Is the ladder properly stowed in the boom support?
- Are the stabilizers properly stowed for travel?
- Is the aerial master switch, located in the cab, in the OFF position?
- Are the tiller tractor wheels in the center position (in line with the apparatus)?
- Is the communication system between the tiller tractor driver and tiller trailer driver operating?

3-1.2 Procedure Concerns at the Scene

- Is the unit to be used for water tower operations or as a rescue unit?
- Take note of all overhead obstructions.
- Position the unit for best attack.

3-1.3 Positioning the Truck for Operation

⚠ WARNING

The area where the ground pads make contact with the ground must be firm and capable of supporting 75 psi. DO NOT set up over manhole covers, storm drains, or underground parking facilities that cannot meet these requirements.

⚠ CAUTION

NEVER bridge across ditches, culverts, or any opening with the ground pads.

NOTE: For positioning, a corner of a building gives access to two sides of the building as well as the roof.

The truck can be positioned facing uphill or downhill—each method has its advantages and disadvantages. In either condition, the truck must be capable of being leveled to within the safe operating limits as described in *“Safe Operating Limits”* on *page 3-4* of this manual.

- Position unit with the tiller tractor within 30 degrees of in line with the tiller trailer. No jackknifing of the unit is required.
- The area around the unit must be clear for stabilizer extension.
- Full stabilizer extension is required for unlimited aerial operation.
- The area where the ground pads make contact with the ground must be firm and capable of supporting 75 psi. DO NOT set up over manhole covers, storm drains, or underground parking facilities that cannot meet these requirements.

3-2. Stabilizer Setup Procedure

WARNING

Personnel must be familiar with the stabilizer setup procedures before positioning stabilizers.

3-2.1 Cab Controls

Figure 3-1: Cab Controls



POM0389

NOTE: • Unit is equipped with built-in safety interlocks. If either of the next two steps are not followed, the aerial PTO will not engage.

1. Shift the truck transmission to NEUTRAL.
2. Apply the PARKING BRAKE and FRONT WHEEL LOCK.
3. Set the AERIAL MASTER switch (1) to the ON position.

NOTE: Continue with the stabilizer setup procedure (See [“Stabilizer Setup”](#) on [page 3-5](#).) if the water pump is not going to be used.

3-2.2 Water Tower with Water Pump Operation

NOTE: The engine must be at idle to engage the pump.

1. Ensure hose is connected between desired pump discharge and aerial inlet on tiller trailer.
2. Check the parking brake, it must be ON.
3. Check the transmission, it must be in NEUTRAL.
4. Push PUMP SHIFT switch down to engage pump.
5. Place transmission in DRIVE.
6. Refer to the water pump manufacturer’s operation manual for more detailed information.

OPERATION

NOTE: The automatic aerial throttle control will be deactivated and the water pump will control the engine throttle. During pump operation the engine rpm is sufficient to operate all aerial functions.

3-2.3 Safe Operating Limits

NOTE: Angle indicators are located near the stabilizer controls.

Table 3-1: Safe Operating Limits

Aerial Capacity Based on Side-to-Side Setup Slope		
Ground Slope	Truck Slope	Capacity
10°	0° to 5°	Full
13°	5.1° to 8°	Half
>13°	>8°	Zero

Aerial Capacity Based on Front-to-Rear Setup Grade		
Ground Slope	Truck Slope	Capacity
7°	0° to 5°	Full
10°	5.1° to 8°	Half
>10°	>8°	Zero

3-2.4 Stabilizer Setup

Figure 3-2: Stabilizer Setup Controls



1082

Item #	Description
1.	Driver Side Stabilizers/Jacks Set Indicator Light
2.	Driver Side Stabilizer Extend
3.	Driver Side Jacks Lower
4.	Passenger Side Stabilizers/Jacks Set Indicator Light
5.	Passenger Side Stabilizer Extend
6.	Passenger Side Jacks Lower
7.	High Idle

1. Set the wheel chocks in place—in back of the front wheels (tiller tractor) if facing uphill; in front of the rear wheels (tiller trailer) if facing downhill.

NOTE: Hydraulic power should be available (aerial master switch in ON position) and the engine should be at low idle. Review preceding steps if you do not have hydraulic power.

2. You now have hydraulic power to function the stabilizer valve controllers. Warning “beepers” will activate when the stabilizers are in motion. They will remain ON until the stabilizers are set, which will be indicated by the green indicator lights.
3. If desired, turn ON the high idle switch. The engine high-idle rpm is preset for maximum hydraulic power.

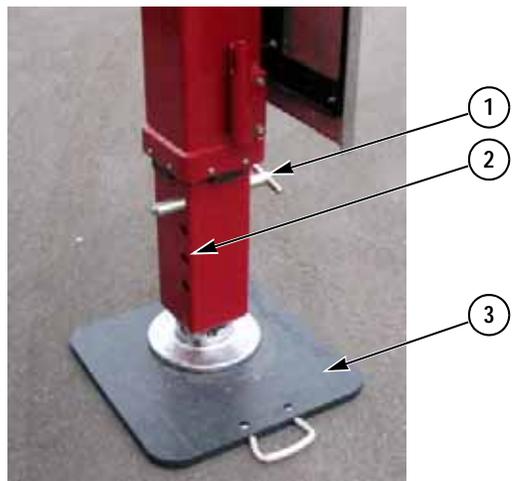
NOTE: To avoid re-leveling the unit, level low side of apparatus before the high side.

WARNING

Stand clear of stabilizer to avoid crushing injury.

- 4. Push switch left or right to OUT to fully extend the stabilizer beam(s).
- 5. Repeat for the opposite side.

Figure 3-3: Positioning Stabilizer



1088

Item #	Description
1.	Stabilizer Jack Safety Pin (<i>Optional</i>)
2.	Safety Pin Holes
3.	Ground Pad

- 6. Position all stabilizer ground pads under the vertical jacks. The handles on the ground pads should be inboard to prevent a tripping hazard.
- 7. Push switch DOWN to lower jacks. Lower each jack until the indicator light is illuminated for all stabilizers.
- 8. Continue activating the stabilizer jack switches until the truck is close to level, both front to rear and side to side. The preferred setup is an uphill position. Stabilizer jacks should be supporting enough weight to remove the bulge from the tiller tractor's rear tires.

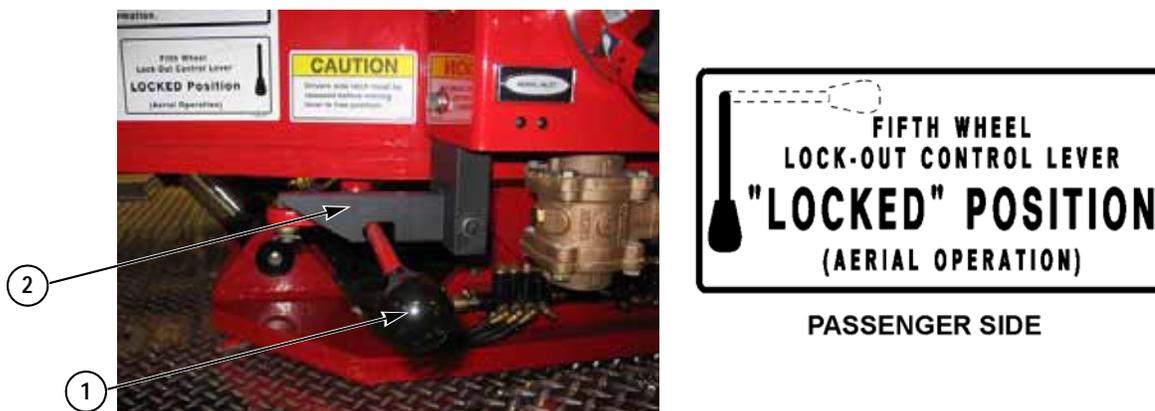
CAUTION

Be sure the unit is set-up within safe operating limits, refer to [Table 3-1](#).

The rear tiller tractor tires must remain in contact with the ground for proper setup.

- 9. If used, turn OFF high idle. When the unit returns to low idle, proceed to next step.

Figure 3-4: Fifth Wheel Lock-Out Control Lever



POM0334, 0335

WARNING

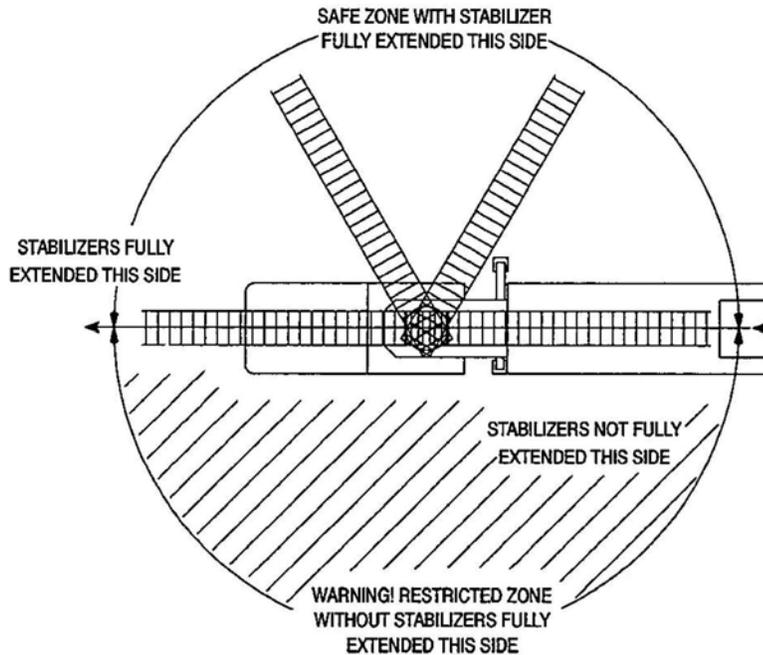
- The fifth wheel must be locked after the stabilizers are deployed and firm on ground.
- Do not free the fifth wheel until the aerial is bedded.
- Do not adjust the stabilizers after the fifth wheel is locked.
- The aerial device may become unstable if operated without the fifth wheel locked.
- Death or serious injury may result if these warnings are not observed.

- NOTE:**
- Driver side is shown. Passenger side is similar.
 - Passenger and driver side lock-out control levers are linked and can be moved to the LOCKED position from either side. Moving lever to the FREE position must be done from the driver side.
 - “Do Not Move Truck” and “Fifth Wheel Lock-Out” indicator light will illuminate when the lock-out control lever is in the “LOCKED” position.

10. Pull lock-out control lever (1) OUT to lock the fifth wheel in place for aerial operations (LOCKED position). Ensure the retaining latch (2) has secured the lock-out control lever (1) in the LOCKED position.
11. Install (*optional*) stabilizer jack safety pins keeping the handle about 1 inch from jack. If a jack settles, it must sit on the pin evenly. Install all stabilizer jack safety pins into the highest available hole on the jack.
12. Reposition wheel chocks, downhill side against tire and the uphill chock approximately 2 inches from tire. The aerial is ready for operations.

3-2.5 Short Jacking on One Side

Figure 3-5: Short Jacking Diagram



POM0336

On occasion, it may be necessary to set up in a confined space where the stabilizers cannot be extended on one side. Operation shall and will be limited to the side where the stabilizers are fully extended.

- On the short jack side, it will be necessary to extend the beam far enough to remove the (*optional*) stabilizer jack safety pin from its storage bracket and install it into the jack assembly.
- If aerial operation is attempted on the unsafe side, the aerial will automatically stop.

3-3. Aerial Operations

⚠ WARNING

Before proceeding, be sure the unit is set-up within safe operating limits, refer to [Table 3-1](#).

⚠ CAUTION

All safety pins and ground pads must be in position before operating aerial.

3-3.1 Operator—Console

- When the unit is leveled and (*optional*) stabilizer jack safety pins installed, one operator **MUST BE** stationed at the turntable console. During operation, the turntable operator's responsibility is to watch and warn of any obstruction the aerial may contact and be ready to override any potential dangerous movement. If there is an operator at the tip, the turntable operator must keep the tip operator informed of ALL hazards.
- If equipped with a Quick-Lock® waterway, select and pin in the position desired (See "[Quick-Lock® Waterway Operation](#)" on [page 3-13](#)).

3-3.2 Operator—Tip (*Optional*)

⚠ WARNING

Personnel on the ladder should wear safety belts connected to the aerial at all times.

The tip operator also checks for obstructions while moving up the ladder.

3-3.3 Tip Controls (*Optional*)

⚠ CAUTION

Because there is no hydraulic oil flowing through these controls, there is no resistance against the control handle. Thus **ANY MOVEMENT** at all will result in a quick response. It is recommended that the operator use **EXTREME CAUTION** until he is familiar with the response of the controllers.

Tip control functions are similar to the turntable controls, except the aerial operates at a reduced speed of the turntable control functions.

A momentary switch on the turntable control console must be held by the turntable operator to provide power to the tip controls. Anytime the switch is released, the tip controls will stop functioning.

3-3.4 Operating Procedure

⚠ WARNING

Electrocution Hazard—Personnel not involved with the aerial operations, stand clear.

Electrical storms can pose a serious hazard to anyone on or near the aerial unit. User discretion is advised.

1. Before beginning aerial operations, the operator must be aware of stabilizer set up and angle of level indicator. The truck must be within the safe operating limits as defined in *“Safe Operating Limits”* on [page 3-4](#).
2. The operator must also monitor the stabilizer ground pads to ensure that the setup site is sound and not creating a hazardous stability condition.
3. Open the control console cover.
4. Activate the alarm/indicator test switch for a pre-operation check.
5. Turn on switches as required for lighting.

⚠ WARNING

- An operator must be stationed at the turntable controls at all times during any aerial operation. This primary operator is responsible for observing all operations and warning or overriding any potentially dangerous condition or movement of a secondary tip operator.
- During operation, continually monitor aerial loading and restrict additional loading and/or any operation that may exceed the limits as shown on the load chart.
- Do not extend or retract the ladder sections with personnel standing on the ladder sections, as legs and feet may be jammed between the rungs.
- The aerial is designed for positive loads. Do not set the aerial on the ground, roof, etc. Any aerial loading or operation of the lowering control while the aerial is in this condition could cause a back-bending negative load to the aerial sections and may cause serious damage.
- The operator is responsible for knowing the condition of the aerial device before operating. This should include a quick visual scan of (but not limited to) pins, cables, cylinders, loose equipment, ladder sections, etc.
- During aerial operations, the safety chains must be hooked in position or the optional spring loaded ManSaver™ safety bar must be across the turntable openings.
- If the aerial contacts a high-voltage power source, **DO NOT TOUCH** the truck and ground at the same time. Depending on the situation, the operator may still be able to move the aerial away from the hazard. Use your own discretion.
- Personnel on the ladder should wear safety belts at all times.
- When fighting fire with the aerial, never work over the roof. The danger of the roof ventilating could be a serious hazard to those on the aerial.
- When using the aerial for rescue operations, try to approach victims from above to avoid victims jumping down onto the aerial, which can cause an overload situation.
- When making a rescue, always position the tip for easy access.
- When using the aerial in extreme cold conditions, be aware of the possibility of ice buildup. Excessive ice buildup may cause overload or damage to the aerial.

⚠ CAUTION

While flowing water, it is recommended that any aerial retraction be performed at a slow speed to avoid excessive water pressure.

Changing to low engine speed while operating multiple controls will reduce the speed of the aerial operation and may cause unexpected movement.

The aerial is capable of being lowered onto the body of the apparatus. Crushing damage to the tiller cab, tiller body, pumphouse, or tractor cab may result.

Ensure that the ladder is fully retracted and will clear the tiller cab before raising. Ensure that the ladder is above the tiller cab, tractor, and trailer body obstructions when continuing the use of other functions.

- NOTE:**
- For single control lever operation, low engine idle speed is sufficient for acceptable performance. For optimum performance, or simultaneous multiple control lever operation, the engine high-idle switch should be activated. Using the engine high idle will provide the maximum hydraulic flow for any combination of aerial operations.

OPERATION

- The tip controls (*optional*) function the same as the console controls. Multiple functions may be operated at the same time.
6. To raise the aerial, step on the aerial deadman switch to activate all functions. Pull back on the RAISE control lever to raise the aerial above the boom support cradle and any body or cab mounted lighting and/or equipment.
 7. To extend the aerial, step on the aerial deadman switch to activate all functions. Move the EXTEND control lever forward. When the ladder nears the desired extension, make small adjustments in extension or retraction until the RUNG ALIGNMENT INDICATOR illuminates. This ensures that all rungs are aligned with each other, making the ladder easier and safer to climb and descend.
 8. To rotate the turntable clockwise (right), step on the aerial deadman switch to activate all functions. Push forward on the ROTATION control lever. To rotate counterclockwise (left), pull back on the ROTATION lever.
 9. Activate the elevation, rotation and extension controls as necessary for positioning and use of the device.
 10. Switch on the intercom and establish communications (if equipped).

NOTE: The shutoff valve on the breathing air bottle must be open to view the remaining air volume.

11. Turn on the breathing air valves at the air bottles and check the gauge on the control console for available volume (if equipped).

3-4. Quick-Lock® Waterway Operation

⚠ WARNING

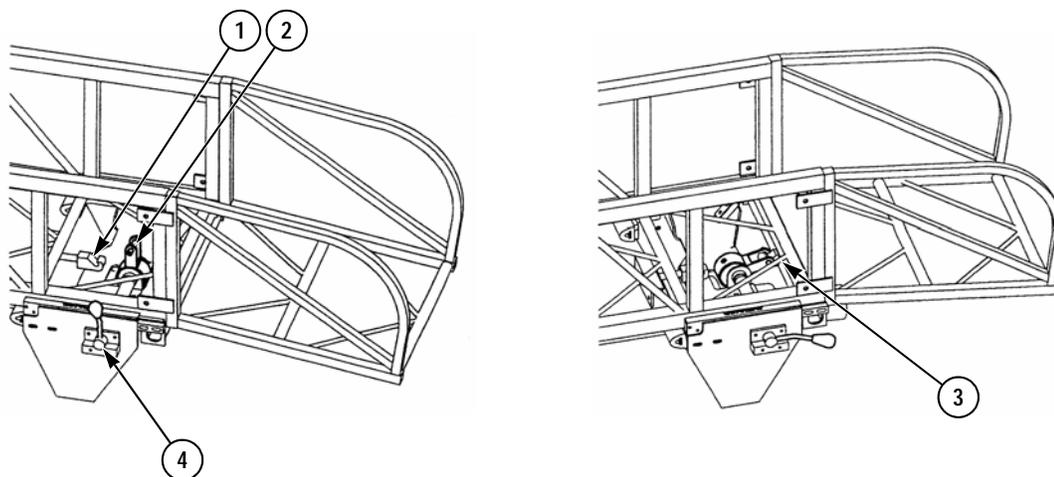
- Do not attempt to change the attachment location of the Quick-Lock® waterway when the aerial waterway is pressurized.
- Do not pressurize the aerial waterway at any time when the connecting link is not securely connected to one of the hooks. A pressurized aerial waterway can cause the waterway to move suddenly and violently, causing bodily injury and severe damage to the aerial device.

⚠ CAUTION

Do not extend or retract the ladder sections with personnel standing on the ladder sections, as legs and feet may be jammed between the rungs.

3-4.1 Pinning the Waterway to the Fly Section

Figure 3-6: Pinning the Waterway to the Fly Section



POM0210, 0211

Item #	Description
1.	Middle Section Hook
2.	Connecting Link
3.	Fly Section Hook
4.	Control Lever

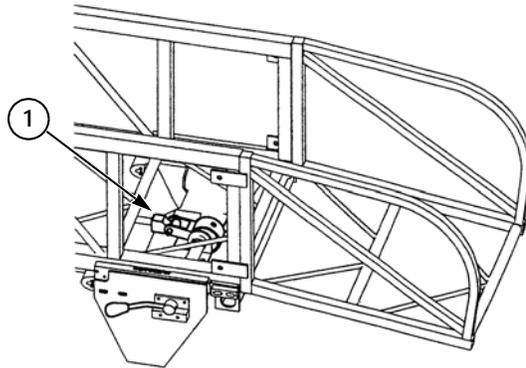
1. When the aerial is fully retracted, rotate the control lever (4) to the forward position to disengage the middle section hook (1).
2. Rotate the connecting link (2) from the middle section hook (1) toward the fly section hook (3).

OPERATION

3. Rotate the control lever (4) to the rear position to give enough extension for the connecting link (2) to reach the fly section hook (3).
4. Secure the connecting link (2) in the fly section hook (3) and rotate the control lever (4) fully forward to lock the waterway to the fly section.

3-4.2 Pinning the Waterway to the Middle Section

Figure 3-7: Pinning the Waterway to the Middle Section



POM0212

1. When the aerial is fully retracted, rotate the control lever (4) to the rear position to disengage the fly section hook (3).
2. Rotate the connecting link (2) from the fly section hook (3) toward the middle section hook (1).
3. Rotate the control lever (4) to the forward position to give enough extension for the connecting link (2) to reach the middle section hook (1).
4. Secure the connecting link (2) to the middle section hook (1) and rotate the control lever (4) fully rearward to lock the waterway to the middle section.

3-5. Lyfe Pulley System Information (*Optional*)

⚠ DANGER

You must not operate this device unless:

- You have been trained.
- You follow the safety and operating recommendations contained in this manual.
- You follow your employer's work rules and applicable government regulations.

Death or serious personal injury may occur if these procedures are not followed.

Use only with NFPA-approved rescue safety rope.

Use this pulley system only on ladders manufactured by Pierce Manufacturing Inc.

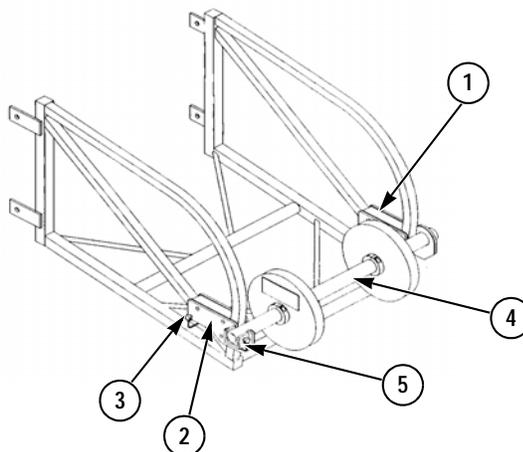
3-5.1 Installation

⚠ DANGER

Use pulley system only when pins and fasteners are properly installed. Use only original equipment fasteners—never use substitute pins or fasteners.

NOTE: The left and right mounting brackets are unique. They are not interchangeable.

Figure 3-8: Install Lyfe Pulley System



POM0268

Item #	Description
1.	Left Mounting Bracket
2.	Right Mounting Bracket
3.	Pins (2 used)
4.	Shaft and Pulley Assembly
5.	Pin

1.	Left Mounting Bracket
2.	Right Mounting Bracket
3.	Pins (2 used)
4.	Shaft and Pulley Assembly
5.	Pin

1. Install left mounting bracket (1) and right mounting bracket (2) on egress with two pins (3).

⚠ DANGER

The pin securing the shaft and pulley assembly must pass through both the right mounting bracket and the shaft.

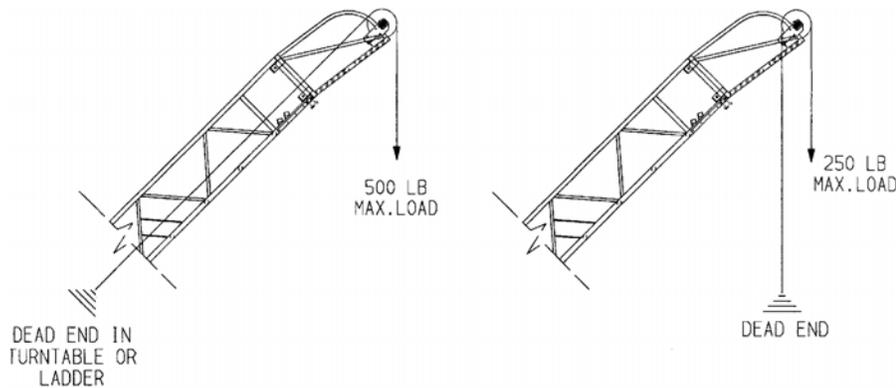
2. Slide shaft and pulley assembly (4) through hole in left mounting bracket (1). Lower other end of shaft into right mounting bracket (2) and secure with pin (5).

3-5.2 Pulley Use Guidelines

⚠ DANGER

- The capacity of the pulley system is 500 pounds, but cannot exceed the remaining ladder tip capacity. To pick up a 500-lb load, the dead end of the rope must be secured to the ladder or turntable. Dead ends secured otherwise limit the capacity to 250 pounds, but cannot exceed one-half of the remaining tip capacity.
- Do not allow the pulley system to come in contact with walls, windows, etc.

Figure 3-9: Pulley Use



POM0269

1. Pulleys may be positioned in any location along the shaft. To reposition pulleys, loosen collar set screws, relocate pulley, and tighten set screws.
2. Observe all department operating procedures concerning the use of rescue equipment.

3-5.3 Removal

1. Remove pin (5) from right mounting bracket (2) and shaft (4).
2. Raise shaft and pulley assembly (4) out of right mounting bracket (2). Slide shaft to the right, out of left mounting bracket (1).
3. Remove two pins (3), left mounting bracket (1), and right mounting bracket (2) from egress.

3-6. Egress Lift Eye (*Optional*)

⚠ DANGER

You must not use this accessory unless:

- You have been trained.
- You follow the safety and operating recommendations contained in this manual.
- You follow your employer's work rules and applicable government regulations.

Death or serious personal injury may occur if these procedures are not followed.

Use only with NFPA-approved rescue safety rope.

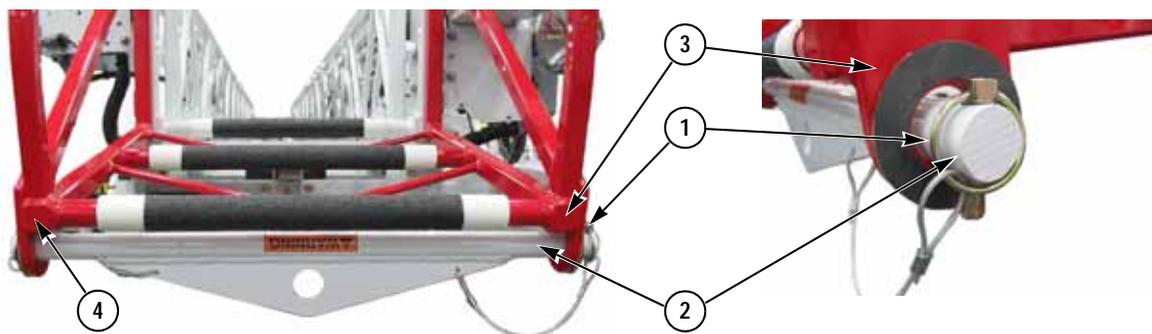
Use the egress lift eye only on ladders manufactured by Pierce Manufacturing Inc.

3-6.1 Installation

⚠ DANGER

- Use the egress lift eye only when pins and fasteners are properly installed. Pins must be installed through the holes in the top of the shaft, with the lock ring completely encircling the shaft and touching the bottom of the pin.
- Use only original equipment fasteners; never use substitute pins or fasteners.
- Properly support the egress lift eye during installation and removal.

Figure 3-10: Egress Lift Eye



1158, 1159

Item #	Description
1.	Lock Pin & Lock Ring
2.	Lift Eye Shaft
3.	Egress Left Mounting Bracket
4.	Egress Right Mounting Bracket

1. Remove two lock pins (1) from lift eye shaft (2).
2. Slide lift eye shaft (2) through hole in left mounting bracket (3). Slide other end of lift eye shaft into right mounting bracket (4) until lift eye shaft is centered in egress.

OPERATION

3. Secure lift eye shaft (2) in egress with two lock pins (1).

3-6.2 Lift Eye Use Guidelines

⚠ DANGER

- Do not exceed aerial capacity when using the egress lift eye. Death or serious injury may occur.
- Do not allow the lift eye to come in contact with walls, windows, etc.
- Side loading the lift eye is not permitted.
- The use of one or more pulleys in conjunction with the egress lift eye can dramatically increase the actual load transferred to the ladder tip. If one or more pulleys are used, the operator must be aware of the impact this has on the ladder load.

1. Observe all department operating procedures concerning the use of rescue equipment.

3-6.3 Removal

1. Remove two lock pins (1) from lift eye shaft (2).
2. Slide lift eye shaft (2) to the left, out of right mounting bracket (4). Slide lift eye shaft back to the right, out of left mounting bracket (3) and remove from egress.
3. Install two pins on shaft.

3-7. Post-Operation Stowing Procedure

3-7.1 Stowing the Aerial

⚠ CAUTION

Before returning the aerial to the stowed position, first completely retract ladder to clear the tiller cab. Failure to comply may result in damage to equipment.

1. After aerial use, stow the aerial in the boom support by retracting the ladder sections, rotating into position, and lowering.
2. When the boom support is contacted and the lift cylinders are no longer supporting the aerial, push forward momentarily on the lowering control to apply only enough down pressure to prevent aerial movement during road travel.
3. Turn off lighting, intercom, and breathing air valve as applicable.
4. Close console cover.

3-7.2 Stowing the Stabilizers

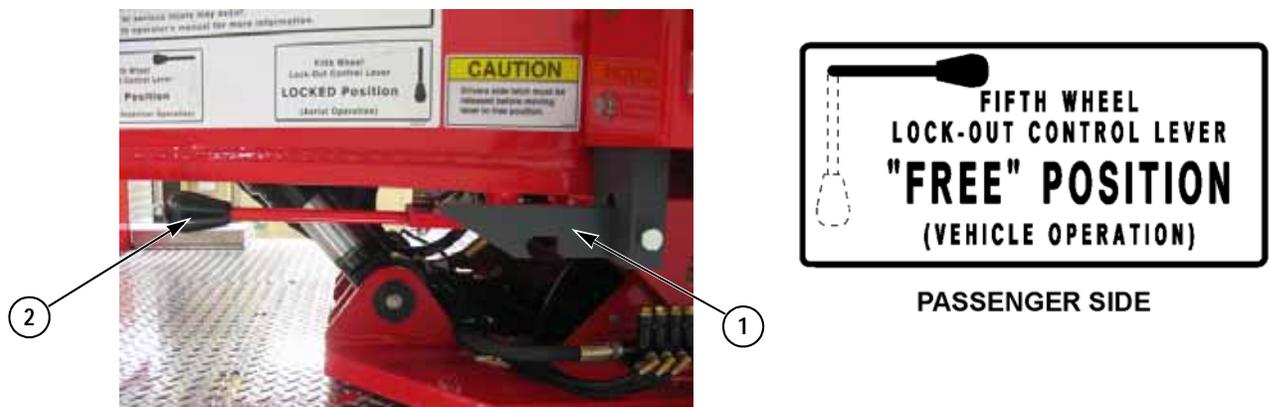
1. Remove *(optional)* stabilizer jack safety pins and place them in their storage brackets.

WARNING

- The fifth wheel must be free before moving vehicle.
- The vehicle handling will be compromised if the vehicle is moved with the fifth wheel locked.
- Death or serious injury may result if these warnings are not observed.

- NOTE:**
- Driver side is shown. Passenger side is similar.
 - Passenger and driver side lock-out control levers are linked and can be moved to the LOCKED position from either side. Moving lever to the FREE position must be done from the driver side.
 - “Do Not Move Truck” and “Fifth Wheel Lock-Out” indicator light will stay illuminated until lock-out control lever is in the “FREE” position.”

Figure 3-11: Fifth Wheel Lock-Out Control Lever



POM0337, 0338

2. Lift retaining latch (1) and push lock-out control lever (2) to FREE position to unlock fifth wheel for normal vehicle/stabilizer operations.
3. Push up on the control switches to raise jacks to their stowed positions.
4. Push the control switches inward to retract the stabilizer beams to their stowed positions.

3-7.3 Preparing for Road Travel

1. Return the stabilizer ground pads and wheel chocks to their storage brackets.
2. Turn the aerial master switch and PTO switch in the cab to the OFF position.

3-8. Overrides

⚠ WARNING

Any time that an override or manual control is used, ALL safety systems are overridden. The operator must be absolutely sure that all safety operating parameters are being met.

NOTE: A manual switch at the console controls the selection of tip or console aerial operation.

3-8.1 Aerial Manual Control Without System Electrical Power

Aerial hydraulic power can be activated by pulling and holding the override knobs. ([“Manual Aerial Override Controls and Pressure Test Ports”](#) on [page 2-20.](#))

3-8.2 Emergency Hydraulic Power

If the main hydraulic system is not functioning, the Emergency Pump Unit (EPU) provides backup power to the main hydraulic system pump. The EPU provides sufficient power to store the aerial and stabilizers. A momentary switch is provided to activate the EPU.

- NOTE:**
- The EPU should be used only when the main system hydraulic pump is not operating.
 - The EPU has a limited run time before possible overheating. **DO NOT** run the EPU for more than 30 minutes without allowing an additional 30 minutes for cooling down. Limiting loads and pressures will allow for more efficient use of the EPU and will also generate less heat.
 - To prevent “dead-heading” the EPU hydraulic pressure, the EPU should be activated only after the desired function is selected.
 - If the electronic system has failed and the manual aerial or stabilizer controls are being used, the EPU switch located at the manual stabilizer controls will be the only one active.

1. Activate the desired function, then hold the EPU switch in the ON position.

3-9. Cold Weather Operation

⚠ WARNING

Use extreme caution when retracting or extending an aerial with ice build up. Move the structure slowly to allow ice to fall away. Be sure no people are under the aerial that could be injured by falling ice.

⚠ CAUTION

- Operation in extreme cold weather may overload and/or damage the aerial.
- Do not use multiple functions until the temperature is above the recommended minimum start-up temperature, or pump cavitation and damage may occur.
- Ice build up on the aerial waterway can cause damage to the seals, wear bands and main tubes during extension and retraction.
- Ice can form inside and between the waterway tubes. During freezing conditions it is best to maintain water flow while extending or retracting the aerial. After flowing water when temperatures are below freezing, immediately elevate and drain the aerial waterway. If ice exists between the waterway tubes, extending the aerial will break the waterway.
- The Pierce Manufacturing warranty does not cover damage caused by extending or retracting a frozen aerial.

During extreme cold weather, certain precautions must be applied to the operation and use of aerial devices. When operation is necessary in extreme cold temperatures, use the following precautions:

- Continued use of the aerial functions will circulate the oil, delaying the ambient temperature cooling effect.
- Slow attentive operation after a period of non-use will be less harmful to the device and may allow the operator time to react to potential problems.

OPERATION

- Continually monitor the hydraulic oil pressure gauge to warn of excessively high pressures that are building during the operation of a function.
- Pay particular attention to electric cables and hoses that are running up the aerial sections. These will become stiff and want to take a set, causing them to track improperly.
- The recommended minimum start-up temperature for the hydraulic system will vary according to the viscosity grade class oil that is installed in your aerial. A label located on the hydraulic reservoir indicates the grade of oil that is installed in your unit. *"Hydraulic Oil Recommendations"* on [page 4-2](#) for additional information.



4-1. Maintenance Introduction

The preventive maintenance section is intended to formally maintain and document the aerial device on a regular schedule. This schedule is intended as a minimum and is greatly dependent on operating conditions. Heavy use and extreme environmental conditions such as heat, cold, sand, or salt spray will demand increased inspection and maintenance.

This preventive maintenance section is not intended to replace or negate any routine pre-operation safety inspections. The aerial operator must be aware of the condition of the aerial equipment before operating. A pre-operational visual safety inspection should always be performed, which may include stabilizers, aerial pivot pins and retaining hardware, cables, sheaves, basket pivot pins, retaining hardware, and other components.

During the warranty period and thereafter, inspections and maintenance schedules must be performed according to the specified Pierce Manufacturing Inc. standards.

Failure to comply with these requirements will be considered grounds or conditions that may void the warranty on individual components, assemblies, or the entire Pierce aerial device.

4-2. Troubleshooting

The following outline represents operational difficulties that may arise during the deployment of the Pierce aerial. It is not a comprehensive list meant to exhaust every possible malfunction of the equipment; rather it is a quick checklist to allow operating personnel to ensure operator error is not preventing the safe deployment of the unit.

Malfunction
Possible Problem
<p>1. PTO Will Not Engage.</p> <ul style="list-style-type: none"> • Aerial master switch is not energized. • Transmission range selector is not in neutral, or water pump engaged and transmission in drive. • Parking brake is disengaged.
<p>2. Stabilizer Circuit Will Not Operate.</p> <ul style="list-style-type: none"> • Hydraulic power switch is in aerial function. • Locked in aerial mode. • Aerial is out of boom support. • PTO is not engaged (see above).
<p>3. Aerial Controls Are Inoperative.</p> <ul style="list-style-type: none"> • PTO is not engaged (see above). • Aerial dead man foot switch is not depressed. • Hydraulic power switch is in stabilizer function. • Stabilizer is not set.

4-3. Hydraulic System

4-3.1 Hydraulic System Components

The hydraulic system consists of a reservoir that supplies oil to a PTO-driven, variable-displacement, piston pump. The hydraulic oil supplied from the pump pressurizes two electric-over-hydraulic closed-center valves. One valve controls the oil flow to the stabilizer system components including the beam extension cylinders and the jack support cylinders. The second valve operates the ladder lift cylinders, extension cylinders, and the rotation drive unit.

A smaller emergency power unit containing a gear pump provides backup hydraulic power in the event of the failure of the main system.

4-3.2 Hydraulic Oil Recommendations

[Table 4-1](#), Hydraulic Oil Recommendations, shows five grades of hydraulic oil recommendations for aerial devices. Each grade has a minimum start-up and normal operating range. One of these grades was used in the initial fill of the system, based on your operating region. Check the oil tag next to the reservoir fill cap for the initial fill grade. Your normal start-up and operating temperature should most closely match the initial fill oil chosen for your unit.

The minimum start-up column shows an oil temperature where the viscosity is at its highest value (thickest point). This is the minimum operating temperature authorized by the pump and valve manufacturers for the given grade of oil. Start-up below this temperature should be infrequent and carefully executed.

The operating range listed provides the optimum oil viscosity for the hydraulic system. Operation below this range may result in slower aerial operation, while operating above this range will reduce system efficiency and may increase component wear.

Table 4-1: Hydraulic Oil Recommendations

Oil	ISO Grade	Minimum Start-Up Temperature	Operating Range
Mobil DTE 18M	100	40°F	78° to 197°F
Mobil DTE 16M	68	27°F	63° to 181°F
Mobil DTE 15M	46	10°F	45° to 160°F
Mobil DTE 13M	32	0°F	37° to 142°F
Mobil DTE 11M	15	-58°F	-24° to 100°F

- NOTE:**
- The above minimum start-up is based on a viscosity of 4000 SUS. The operating range is based on a viscosity range from 1000 to 80 SUS. When choosing an alternate oil, the temperature values in the above chart will change. Ask your oil supplier what temperature the oil will be for 4000, 1000, and 80 SUS viscosity.
 - Mobil Oil is shown in [Table 4-1](#) but other high-quality comparable oils may be substituted. Substitute oils should have multi-grade viscosity characteristics, with low temperature flow properties and high anti-wear protection.
 - We recommend taking an initial sample of hydraulic oil and having it analyzed to serve as a baseline for future oil analysis results.
 - Your Pierce aerial was shipped with a hydraulic oil cleanliness level of 18/15/13, per the latest ISO standard 4406. Any changes of, or additions to, the aerial hydraulic oil should be with the appropriate type—filtered to the same cleanliness level. Unfiltered oil may have an affect of the life or operation of some components.

4-3.3 Hydraulic Oil Filter Recommendations.

The hydraulic filters shown in [Table 4-2](#) are used in the aerial hydraulic system of your Pierce vehicle. Used oil and filters should be carefully collected and disposed of properly as required by law.

Table 4-2: Hydraulic Oil Filter Recommendations

Item Description	Pierce Part Number
Return Filter Assembly	53-0384
High-Pressure Filter Assembly	53-4193
Return Filter Replacement Element	1548169
High-Pressure Filter Replacement Element	1262356
High-Pressure Filter Replacement O-Ring	TBD

4-3.4 Recommended Lubricants

Synthetic Grease

- Cartridge, Pierce Manufacturing Inc. Part No. 1003040; SYNCO Super Lube #41150
- 5 LB pail, Pierce Manufacturing Inc. Part No. 1003044; SYNCO Super Lube #41050
- 30 LB pail, Pierce Manufacturing Inc. Part No. 1003046; SYNCO Super Lube #41030

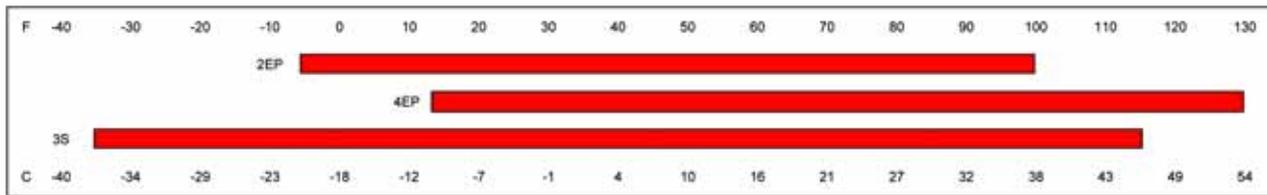
MAINTENANCE

Gear Lube

The following specifications are intended to help you determine which lubricant is best suited for your application. The planetary gear manufacturer has listed one readily available product in each temperature range that has been tested and meets their specifications. This is not to say that other lubricant brands would not perform equally as well. If the following lubricants are not available in your area, make certain your lubricant vendor supplies you with oil that is equivalent to those products listed below.

As recommended by the planetary gear manufacturer, AGMA 2EP gear oil has been installed to provide optimum performance in a wide range of temperatures. Alternate grades are shown for replacement in climates that may fall outside the temperature range of the original fill. Use only premium AGMA (American Gear Manufacturers Association), EP (Extreme Pressure) gear oils.

Table 4-3: Ambient Temperature Chart for Gear Lube



AGMA 2EP, ISO GRADE 68; -5°F to 100°F
AGMA 4EP, ISO GRADE 150; 12°F to 130°F
AGMA SYNTHETIC 3S (3EP), ISO GRADE 100; -35°F to 115° F

4-4. Preventive Maintenance Checks and Service

4-4.1 Introduction

These checks and services have been provided to help you keep your equipment in good operating condition and in service.

The preventive maintenance section is intended to formally maintain and document the aerial device on a regular schedule. This schedule is intended as a minimum and is greatly dependent on operating conditions. Heavy use and extreme environmental conditions such as heat, cold, sand, or salt spray will demand increased inspection and maintenance.

This preventive maintenance section is not intended to replace or negate any routine pre-operation safety inspections. The aerial operator must be aware of the condition of the aerial equipment before operating. A pre-operational visual safety inspection should always be performed, including checking stabilizers, aerial pivot pins & retaining hardware, cables, sheaves, basket pivot pins, retaining hardware, etc.

An Equipment Inspection and Maintenance Worksheet should be completed each time an inspection is performed. A blank worksheet follows this section of the manual. (Additional worksheets may be photocopied.) A copy of the completed worksheet should be retained by the customer as a permanent record of the maintenance actions performed.

During the warranty period, and thereafter, inspections and maintenance schedules must be performed according to the specified Pierce Manufacturing Inc. standards.

Failure to comply with these requirements will be considered grounds or conditions that may void the warranty on individual components, assemblies, or the entire Pierce aerial device.

4-4.2 Explanation of Columns

- Item No.** Numbers in this column are to be used as a source of the item number for the “Item No.” column on the Equipment Inspection and Maintenance Worksheet.
- Item to Check/Service** This column tells you the item to be checked or serviced.
- Procedural Steps** This column tells you how to perform the required check or service.

4-5. Primary Inspection

NOTE: Perform this inspection within the first 10 hours of operation and with each inspection thereafter.

Table 4-4: Primary Inspection

Item No.	Item to Check/Service	Procedure
1	PTO Operation	<p>Check that switch operates properly—this includes the aerial PTO switch and aerial master switch.</p> <p>Check that PTO indicator light is functional.</p> <p>Check that no excessive gear mesh noise is present during engagement of PTO.</p> <p>Verify the operation of the neutral safety interlock. This is checked by shifting the transmission into drive or reverse—the PTO should disengage in both gears. Also, check for PTO disengagement with the transmission in neutral and the parking brake released.</p>
2	Hydraulic Oil Level	<p>NOTE: The aerial must be cradled with all stabilizers in the stowed position to obtain a proper oil reading.</p> <p>Check the oil level gauge. The proper oil level is “F.”</p>
3	Hydraulic Pressure Lines	<p>These lines should be checked for leakage at fittings and at crimp on ends. Also, inspect hose routing and check for any signs of hose chafing.</p>
4	Stabilizer/Aerial Interlocks and Indicators	<p>With the stabilizers stowed, depress the aerial deadman foot switch. Using the lower control, try to operate the aerial down function. If there is no pressure increase on the system pressure gauge, the interlock is functioning properly.</p> <p>Set the stabilizers to see that the interlock indicator lights illuminate.</p> <p>Check that the switches that operate these lights are functional, mounted properly, and secure.</p>
5	Stabilizer Pads	<p>Inspect the stabilizer pads for proper installation and freedom of movement. These are the feet attached to the bottom of the jack beams, on which the stabilizers sit.</p>
6	Stabilizer Work Lights and Flashing Lights	<p>Check the work lights (white lights under the stabilizer wells) for proper operation.</p> <p>Check the jack flashing lights on the inside of the jack beam. Also, check the lens for any damage.</p>
7	Stabilizer Jack Safety Pins (<i>Optional</i>)	<p>Check that the stabilizer jack safety pins are present and not damaged. Check that they insert properly into the holes on the inner jack box.</p>
8	Electrical Lines and Hoses	<p>Inspect electrical lines and hoses that provide service to the ladder tip. Inspect exposed areas for any chafing or wear.</p>
9	Sheaves and Carrier Assembly	<p>Check the sheaves and carrier assembly for any damage, and whether it travels properly through the guide brackets while the aerial is extending and retracting. Also check for proper tension. Adjustments can be made at the cable anchor point.</p>
10	Waterway	<p>Check waterway for proper alignment and lubrication.</p>
11	Quick-Lock® Waterway	<p>Check for 5/8 in. gap between rubber bumper and mid-section when pinned to the fly-section. Check for smooth operation of cam and the condition of the slide pads.</p>
12	Safety Decals	<p>Make sure that all safety decals and other operational decals are in place.</p>
13	Intercom System	<p>Check intercom system for proper operation. If there is a pump-mounted intercom, it should also be inspected.</p>
14	Rung Covers	<p>Check rung covers on ladder sections.</p> <p>Ensure that they are secure and not damaged.</p>

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Table 4-4: Primary Inspection (Continued)

Item No.	Item to Check/Service	Procedure
15	Breathing Air System <i>(if equipped)</i>	Check breathing air system for leakage and proper operation <i>(optional)</i> . If applicable, open tank valve to charge low-pressure side. Close tank valve and note the pressure on the low-pressure gauge. Let system sit for a one-hour period. After a one-hour period, check for pressure drop.
16	Aerial Function Check	Perform aerial function check from the turntable console and from the tip (if applicable).
17	Aerial Indicators	Check operation of aerial indicators. Check operation of rung alignment light. Check rung alignment switch at front of base section for proper alignment. Check angle indicator on the end of the base section for damage. Check operation of all other gauges, switches, and indicator lights on all control panels.
18	Manual Overrides	Check operation of manual override controls.
19	Emergency Hydraulic Pump (EPU)	Check emergency hydraulic pump operation for stabilizer and aerial functions.
20	Lubrication	Lubricate complete aerial unit—refer to the lubrication chart (" Lubrication Specifications " on page 4-16).

4-6. 25-Hour/Quarterly Inspection

NOTE: Every 25 hours of aerial operation or quarterly (whichever occurs first), perform the primary inspection, then the following maintenance procedures:

Table 4-5: 25-Hour/Quarterly Inspection

Item No.	Item to Check/Service	Procedure
1	Electro-Hydraulic Swivel	Check the desiccator plug indicator(s) on the swivel. If the center of the indicator is pink, replace the desiccator plug.

4-7. 3,000-Mile/Semi-Annual Lubrication

NOTE: Every 3,000 miles or 6 months, grease the fifth wheel bearing connecting the tractor to the tiller trailer.

4-7.1 Grease Fitting Location

Figure 4-1: Fifth Wheel Bearing Grease Fittings



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There are two grease fittings (1) remotely mounted on the upper fifth wheel weldment (2), directly above the fifth wheel bearing. Each fitting is connected to the bearing with grease line tubing, spaced 180 degrees apart. Each of the grease fittings are easily reached by standing next to the rear chassis tires.

4-7.2 Lubrication Procedure

WARNING

If an operator is being used to reposition the vehicle during this procedure, the service technician must remain clear of the vehicle when the tractor/trailer is being repositioned. Failure to comply may result in personal injury or death.

CAUTION

To distribute the grease throughout the circumference of the bearing, the bearing needs to be rotated by pivoting the tractor/trailer combination during the procedure. Failure to follow this procedure completely may result in areas of the bearing being under-lubricated.

1. Position the tractor / trailer in a jackknife condition, 90 degrees to one side.
2. Put the transmission in NEUTRAL and apply the parking brake.

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3. Using a grease gun, dispense two pumps of grease into each grease fitting.
4. Reposition the unit approximately 20 degrees from the jackknife position (70 degrees from straight ahead), put transmission in neutral, apply parking brake and dispense two more pumps of grease into each fitting.
5. Repeat this procedure every 20 degrees (a total of 10 grease positions) until the unit is in the opposite jackknife position.

4-8. 50-Hour/Annual Inspection

NOTE: Every 50 hours of aerial operation or annually (whichever occurs first), perform the primary inspection, the 25-hour/quarterly inspection, then the following maintenance procedures:

Table 4-6: 50-Hour/Annual Inspection

ITEM NO.	ITEM TO CHECK/SERVICE	PROCEDURE
1	Hydraulic Pump and PTO Installation	Check PTO to transmission mounting; also check pump mounting. Check all hoses and mounting flanges for leakage.
2	Aerial Cradle	Check aerial cradle for secure mounting, defective welds, or structural cracks.
3	Stabilizer Extension Cylinders	Remove the cover plates from the beam housings and inspect the inside of the stabilizer beams for any chafing or leakage of hoses and fittings. Check for any signs of binding.
4	Stabilizer Jack Cylinder Drift Test	<p>NOTE:</p> <ul style="list-style-type: none"> • This check may be performed together with the elevation cylinder drift test and extension cylinder drift test. • If the system oil temperature differs from the ambient temperature, an additional wait time is required for the oil temperature to equalize. This will prevent drift errors due to the expansion or contraction of the oil. <p>Perform drift-down check on all stabilizer jack cylinders.</p> <p>Set the unit up with the stabilizers as described in the normal setup procedures. Using a marking pencil of some type, mark all four of the inner jack boxes, <u>1/2 inch</u> under the outer box. Let the unit sit for a one-hour period.</p> <p>For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.</p>
5	Electro-Hydraulic Swivel	Check the electro-hydraulic swivel for mounting security and check for leaks. Also, check electrical wires for wear.
6	Swing Drive Gear Oil Level	Remove the fill plug from the swing drive gearbox; if the oil level is within one inch of the plug, the unit has a sufficient amount of oil.
7	Lift Cylinders	Inspect the lift cylinders for proper mounting. Check cylinder pins and retaining bolts for security. Check cylinder rod for any unusual leakage. Check pins at turntable and on the aerial base section for security, as well as their lock bolts. Check all hoses to the cylinders for any leakage, proper routing, and chafing.
8	Extension Cylinders	Inspect extension cylinders for proper mounting. Check cylinder pins and retaining bolts for security. Check cylinder rod for any unusual leakage. Check security of all bolts and pin where cylinders mount to base sections. Check all hoses to the extension cylinders for proper routing, leakage, and chafing.
9	Wire Rope Cables	Adjust extension and retraction cables, see service group 8300-P-033, Wire Rope (Cable) Replacement/Adjustment.
10	Electrical Cables	Check and adjust electrical cables if necessary. Monitor these cables and readjust the tension if necessary.

Table 4-6: 50-Hour/Annual Inspection (Continued)

ITEM NO.	ITEM TO CHECK/SERVICE	PROCEDURE
11	Fifth Wheel Lock-Out	While rotating the aerial, monitor movement of the fifth wheel lock-out cylinder rods. If the rod movement is greater than 1/4 inch during compression strokes (aerial side-to-side movement), the bleeding procedure must be performed.
12	Base Side and Bottom Pads	Inspect base side and bottom pads for proper adjustment. To check adjustment on side thrust pads be sure that pads are making contact with sides of mid rung rails and that the mid section is centered in the base section. Check bottom pads to see if the mid section is traveling on top of these pads and not the base section itself. The minimum clearance to the base section is <u>1/8 inch</u> .
13	Base Section Pivot Pins and Lift Cylinder Pins	Check base section pivot pins and lift cylinder pins for security or cracking.
14	Waterway and Water Monitor	Check waterway and water monitor for security and leakage.
15	Rotation Bearing Bolts	Check rotation bearing bolts.
16	Stabilizer Jacks	Check stabilizer jacks for tightness and clearance between guide pads.
17	Stabilizer Beams	Check stabilizer beams for scoring.

Table 4-6: 50-Hour/Annual Inspection (Continued)

ITEM NO.	ITEM TO CHECK/SERVICE	PROCEDURE
18	Aerial Function Time Checks	<p>Perform aerial function time checks:</p> <p>NOTE: Differences in times to raise, lower, extend, and retract functions are to be expected. However, times required to rotate 360° to the right and left should be approximately the same. For specifications related to your apparatus, see the “Specifications for Setup and NFPA Testing” data placard located on the aerial.</p> <p>Aerial fully retracted, elevate from 0° to 75°—record time. Aerial fully retracted, lower from 75° to 0°—record time. Elevate aerial to 75°, fully retracted, extend ladder fully—record time. With aerial remaining at 75°, retract ladder fully—record time. Rotate 360° to left, with aerial raised 75°—record time. Rotate 360° to right, with aerial raised 75°—record time.</p>
19	Aerial Pressures	<p>Check and record aerial pressures at high idle:</p> <p>Main relief pressure is checked by dead-heading against a function and recording the pressure registered on the <u>console control</u> gauge. Fully retracted lower pressure is obtained with aerial in a downward motion. Fully retracted raise pressure is obtained with aerial in an upward motion. Elevated to 45° extend pressure is obtained in motion. Elevated to 45° retract pressure is obtained in motion. Left and right swing pressures may be obtained at any elevation in motion with the aerial fully retracted.</p>
20	Elevation Cylinder Drift Test	<p>NOTE:</p> <ul style="list-style-type: none"> • This check may be performed together with the stabilizer jack cylinder drift test and extension cylinder drift test. • If the system oil temperature differs from the ambient temperature, an additional wait time is required for the oil temperature to equalize. This will prevent drift errors due to the expansion or contraction of the oil. <p>Perform elevation cylinder drift-down check on both cylinders together: Fully extend and elevate the aerial to 60° elevation; turn truck off. Toggle the manual control valve handle to remove pressure and wait 10 minutes. Measure from rod gland to a mark on the piston rod. Allow aerial to remain at this elevation for a period of one hour. Re-measure. For specifications related to your apparatus, see the “Specifications for Setup and NFPA Testing” data placard located on the aerial.</p>
21	Extension Cylinder Drift Test	<p>NOTE:</p> <ul style="list-style-type: none"> • This check may be performed together with the stabilizer jack cylinder drift test and elevation cylinder drift test. • If the system oil temperature differs from the ambient temperature, an additional wait time is required for the oil temperature to equalize. This will prevent drift errors due to the expansion or contraction of the oil. <p>Perform extension cylinder drift-down check on both cylinders together: Fully extend and elevate the aerial to 60° elevation; turn truck off. Toggle the manual control valve handle to remove pressure and wait 10 minutes. Mark end of the mid section rung rails in relation to the base section. Allow aerial to remain at this elevation for a period of one hour. Re-measure. For specifications related to your apparatus, see the “Specifications for Setup and NFPA Testing” data placard located on the aerial.</p>
22	Exterior Finish (Painted Surfaces)	<p>Apply touch-up paint to all damaged paint and other corrosion areas.</p>

4-9. 400-Hour/Annual Inspection

NOTE: Every 400 hours of aerial operation or annually (whichever occurs first), perform the primary inspection, the 25-hour/quarterly inspection, the 50-hour/annual inspection, then the following maintenance procedures:

Table 4-7: 400-Hour/Annual Inspection

ITEM NO.	ITEM TO CHECK/SERVICE	PROCEDURE
1	Hydraulic Filters	Replace hydraulic return and pressure filters. Emphasis should be made that dirt is a major factor in hydraulic system failures.
2	Hydraulic Oil	Pierce Manufacturing Inc. recommends taking a sample of hydraulic oil and having it analyzed by a local company. The sample should be taken following 30 minutes of aerial operation.
3	Electro-Hydraulic Swivel Bolts	Re-torque the electro-hydraulic swivel mounting bolts. For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.
4	Rotation Bearing Bolts	Re-torque the rotation bearing to torque box and turntable mounting bolts (top and bottom). For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.
5	Pinion Gear Backlash	Check the pinion gear backlash and adjust if necessary. For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.
6	Boom Support	Re-torque the boom support mounting bolts. For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.
7	Swing Drive Bolts	Re-torque the swing drive bolts on the turntable: <ul style="list-style-type: none"> • Pedestal-to-planetary drive bolts. For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.
8	Aerial Torque Box Bolts	Re-torque the aerial torque box mounting bolts. For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.
9	Fifth Wheel Assembly Bolts	Re-torque the fifth wheel assembly bolts: <ul style="list-style-type: none"> • Fifth wheel assembly to tractor frame bolts. • Lower bearing bolts to fifth wheel assembly. • Upper bearing bolts to gooseneck assembly. For specifications related to your apparatus, see the "Specifications for Setup and NFPA Testing" data placard located on the aerial.

4-10. Extreme Environment Maintenance Precautions

The type of service and regional area could be detrimental in the operation and longevity of this device. Both temperature and environmental conditions are significant.

4-10.1 General Temperature Concerns

The recommended start-up temperatures for the hydraulic system depend on the viscosity grade of hydraulic oil installed in your aerial. A label located on the hydraulic oil reservoir indicates the grade of oil installed in your unit.

4-10.2 Extreme High-Temperature Concerns

- During high temperature periods, monitor the hydraulic oil temperature and avoid any unnecessary use of the aerial. Continued use above the maximum recommended operating range may reduce the life of some aerial components. (Refer to [Table 4-1](#) at the beginning of this maintenance section, to determine the temperature range of hydraulic oils used in Pierce aerial units.)
- In high temperature climates where low temperatures are unlikely, use grease with a high melting point for the ladder guide pad areas and the rotation gear/pinion to provide extended coverage of these areas.

4-10.3 Extreme Low-Temperature Concerns

CAUTION

- **Operation in extreme cold weather may overload and/or damage the aerial.**
- **Do not use multiple functions until the temperature is above the recommended minimum start-up temperature, or pump cavitation and damage may occur.**

- During cold weather periods, monitor the hydraulic oil temperature. If it falls slightly below the recommended operating range, the function speed may diminish. If the oil temperature falls below the recommended start-up temperature, the continuous running of an aerial function will help to warm the oil. (See [Table 4-1](#), Hydraulic Oil Recommendations, at the beginning of this maintenance section to determine the temperature range of hydraulic oils used in Pierce aerial units.)
- Maintain only a thin film of low melting point grease on the ladder section guide pad areas and on the rotation gear/pinion. Allowing a build-up of heavy grease will degrade the aerial operation.
- Continued use of the aerial functions will circulate the oil, delaying the ambient cooling effects.

4-10.4 Extreme Wind-Swept Sand and Dirt Concerns

In environments where wind swept sand and dirt find their way into all areas of the aerial, more frequent cleaning is required.

- Remove contaminated grime from the telescopic waterway tubes. They should be clean at all times. A light coat of very thin oil will improve the lubricity; however, too much oil will only attract more contamination.
- The wire rope cables should be clean. **DO NOT** use solvents on the cables. Using solvent on the cables will remove the internal lubrication from the cables. Use only a “penetrating” cable lubricant when lubricating the cables.
- Clean and remove contaminated grease from the rotation bearing gear and pinion gear. These should have only a light coating of clean grease.

4-10.5 Salt-Air Environment Concerns

- Touch up painted areas showing signs of rust to prevent further corrosion.
- Clean and lubricate unpainted areas such as pins and cables. Use only a “penetrating” cable lubricant when lubricating the cables.

4-11. Stressed Fastener Maintenance

4-11.1 Introduction

The purpose of these instructions is to emphasize the importance of the role that nut and bolt combinations play in providing the structural strength required by Pierce aerial devices. These fasteners are not only critical for structural strength, they also affect performance and reliability. Improper variation in torque may cause distortion, binding, or fatigue failure of components.

The following material gives complete information on all aspects of stressed fastener maintenance for all models of Pierce aerial devices, including:

- Identification and application of bolt sizes and grades.
- Proper torque of all sizes and grades of bolts.
- Torque wrench information and associated equipment.

Adhering to these recommendations will add materially to the life and safety of your Pierce Manufacturing Inc. Aerial Division product.

4-11.2 Identification and Application of Bolt Sizes and Grades

How to determine the size of a stressed fastener:

Diameter

Measure the head size of the bolt; refer to [Table 4-8](#).

Table 4-8: Bolt Sizes

Head Size	Bolt Thread Dia.	NC (Coarse) Thread/in.	NF (Fine) Thread/in.
1-1/2"	1"	8	12
1-5/16"	7/8"	9	14
1-1/4"*	3/4"	10	16
1-1/8"*	3/4"	10	16
1-5/16"	5/8"	11	18
3/4"	1/2"	13	20

* If the bolt head measures 1-1/4" or 1-1/8", the diameter of the bolt is 3/4".

Length

At a minimum, bolts must extend into the threaded area of the bearing, tapered shaft, or plate that they secure a distance equal to the diameter of the bolt being used.

Further penetration of the bolt into the threaded area is desirable, as long as the bolt does not bottom out.

For nut/bolt combinations, the bolt length should be sufficient to allow the bolt to extend through the materials being clamped, locking devices (washers), and nut so a minimum of 1-1/2 threads are protruding through the nut, after the desired level of tightness (torque) is attained.

Grade

CAUTION

Always replace screws/bolts with the same grade as the original fastener.

NOTE: SAE standards require the manufacturer's logo or trademark to be included in the head pattern. Certain bolts may be marked in a similar manner and not meet the specifications set forth in these standards. Bolts purchased from distributors other than the original equipment manufacturer (OEM) should be accompanied by certification documents to ensure the integrity of the equipment is maintained.

Bolts of the same diameter may differ greatly from one another in terms of strength. Depending on the material composition and manufacturing process, the tensile strength of a bolt can vary from 64,000 psi to 180,000 psi. The relative strength of a fastener is indicated by the head shape and standard markings designated for this purpose.

Hex head cap screws, commonly found on Pierce Manufacturing Inc. aerial equipment will be marked with diagonal lines, numbering from two to six.

4-11.3 Proper Torque of all Sizes and Grades of Bolts

Identification of bolt grade is always necessary. When marked as a high-strength fastener (Grade 5, Grade 8, etc.), the mechanic must be aware that these are highly stressed components and must be torqued accordingly.

Special attention should be given to lubrication, plating and other factors that would dictate a deviation from the standard torque values.

4-11.4 Torque Wrenches and Associated Equipment

Torque Wrenches

These wrenches are precision instruments and must be handled with care to ensure proper calibration accuracy. Calibration checks should be made on a regularly scheduled basis. Whenever a torque wrench may have been overstressed or damaged, it should be removed from service until re-calibrated or replaced.

Rigid click-type torque wrenches, which have torque-limiting devices that can be preset to the required torque values are recommended.

When using the torque value chart, values close to the mid-range are recommended to allow for torque wrench calibration tolerances. Erratic or jerking motion of the wrench can easily result in excessive torque values. Always use slow, even wrench movements and stop when the predetermined value has been reached.

Associated Equipment

Certain accessories used in conjunction with the torque wrench enable maintenance personnel to properly service the stressed fasteners encountered on Pierce Manufacturing Inc. aerial devices. The proper use of these tools and their intended application are outlined in the following paragraphs.

NOTE: A torque multiplier increases the output force of the socket by approximately four times the value that is introduced by the torque wrench. Factoring the torque value (typically one-fourth the desired value) to provide the desired torque is necessary when using a torque multiplier. Follow manufacturer's instructions for your specific torque multiplier.

Torque multipliers provide the maintenance personnel with fastener-tightening power that requires approximately one-fourth the force required using conventional tools. They provide safe, convenient tightening power when confronted with the need for high-torque values within a limited amount of working or leverage space.

Table 4-9: Suggested Assembly Torque Values to Produce Corresponding Bolt Loads

Size	Grade 2 			Grade 5 			Grade 8 		
	Clamp Load (lb)	Assembly Torque		Clamp Load (lb)	Assembly Torque		Clamp Load (lb)	Assembly Torque	
		Dry (lb)	Lub.* (lb)		Dry (lb)	Lub.* (lb)		Dry (lb)	Lub.* (lb)
4-40	250	5-in	4-in	380	8-in	6-in	540	12-in	9-in
4-48	275	6-in	5-in	420	9-in	7-in	600	13-in	10-in
6-32	375	10-in	8-in	580	16-in	12-in	820	23-in	17-in
6-40	420	12-in	9-in	640	18-in	13-in	920	25-in	19-in
8-32	580	19-in	14-in	900	30-in	22-in	1260	41-in	31-in
8-36	610	20-in	15-in	940	31-in	23-in	1320	43-in	32-in
10-24	725	27-in	21-in	1120	43-in	32-in	1580	60-in	45-in
10-32	825	31-in	23-in	1285	49-in	36-in	1800	68-in	51-in
1/4-20	1320	66-in	50-in	2000	8-ft	75-in	2850	12-ft	9-ft
1/4-28	1500	76-in	56-in	2300	10-ft	86-in	3250	14-ft	10-ft
5/16-18	2160	11-ft	8-ft	3350	17-ft	13-ft	4700	25-ft	18-ft
5/16-24	2400	12-ft	9-ft	3700	19-ft	14-ft	5200	25-ft	20-ft
3/8-16	3200	20-ft	15-ft	4950	30-ft	23-ft	7000	45-ft	35-ft
3/8-24	3620	23-ft	17-ft	5600	35-ft	25-ft	7900	50-ft	35-ft
7/16-14	4390	32-ft	24-ft	6800	50-ft	35-ft	9550	70-ft	55-ft
7/16-20	4900	36-ft	27-ft	7600	55-ft	40-ft	10,650	80-ft	60-ft
1/2-13	5850	50-ft	35-ft	9000	75-ft	55-ft	12,750	110-ft	80-ft
1/2-20	6600	55-ft	40-ft	10,250	90-ft	65-ft	14,375	120-ft	90-ft
6/16-12	7500	70-ft	55-ft	11,600	110-ft	80-ft	16,375	150-ft	110-ft
9/16-18	8400	80-ft	60-ft	13,000	120-ft	90-ft	18,250	170-ft	130-ft
5/8-11	9350	100-ft	75-ft	14,400	150-ft	110-ft	20,350	220-ft	170-ft
5/8-18	10,550	110-ft	85-ft	16,375	180-ft	130-ft	23,000	240-ft	180-ft
3/4-10	13,800	175-ft	130-ft	21,300	260-ft	200-ft	30,100	380-ft	280-ft
3/4-16	15,400	200-ft	150-ft	23,800	300-ft	220-ft	33,500	420-ft	320-ft
7/8-9	11,450	170-ft	170-ft	29,450	430-ft	320-ft	41,600	600-ft	460-ft
7/8-14	12,600	180-ft	140-ft	32,450	470-ft	360-ft	45,900	660-ft	500-ft
1-8	15,000	250-ft	190-ft	38,600	640-ft	480-ft	54,500	900-ft	680-ft
1-12	16,400	270-ft	210-ft	42,300	710-ft	530-ft	59,700	1000-ft	740-ft
1-14	16,800	280-ft	210-ft	43,400	730-ft	540-ft	61,200	1020-ft	760-ft
1-1/8-7	18,900	350-ft	270-ft	42,300	800-ft	600-ft	68,900	1280-ft	960-ft
1-1/8-12	21,200	400-ft	300-ft	47,500	880-ft	660-ft	77,000	1440-ft	1080-ft
1-1/4-7	24,000	500-ft	380-ft	53,800	1120-ft	840-ft	87,200	1820-ft	1360-ft
1-1/4-12	26,600	550-ft	420-ft	59,600	1240-ft	920-ft	96,600	2000-ft	1500-ft
1-3/8-12	28,600	670-ft	490-ft	64,100	1460-ft	1100-ft	104,000	2380-ft	1780-ft
1-3/8-12	32,500	750-ft	560-ft	73,000	1680-ft	1260-ft	118,400	2720-ft	2040-ft
1-1/2-6	34,800	870-ft	650-ft	78,000	1940-ft	1460-ft	126,500	3160-ft	2360-ft
1-1/2-12	39,100	980-ft	730-ft	87,700	2200-ft	1640-ft	142,200	3560-ft	2660-ft

NOTE: When the maximum torque values have been exceeded, the fastener must be replaced.

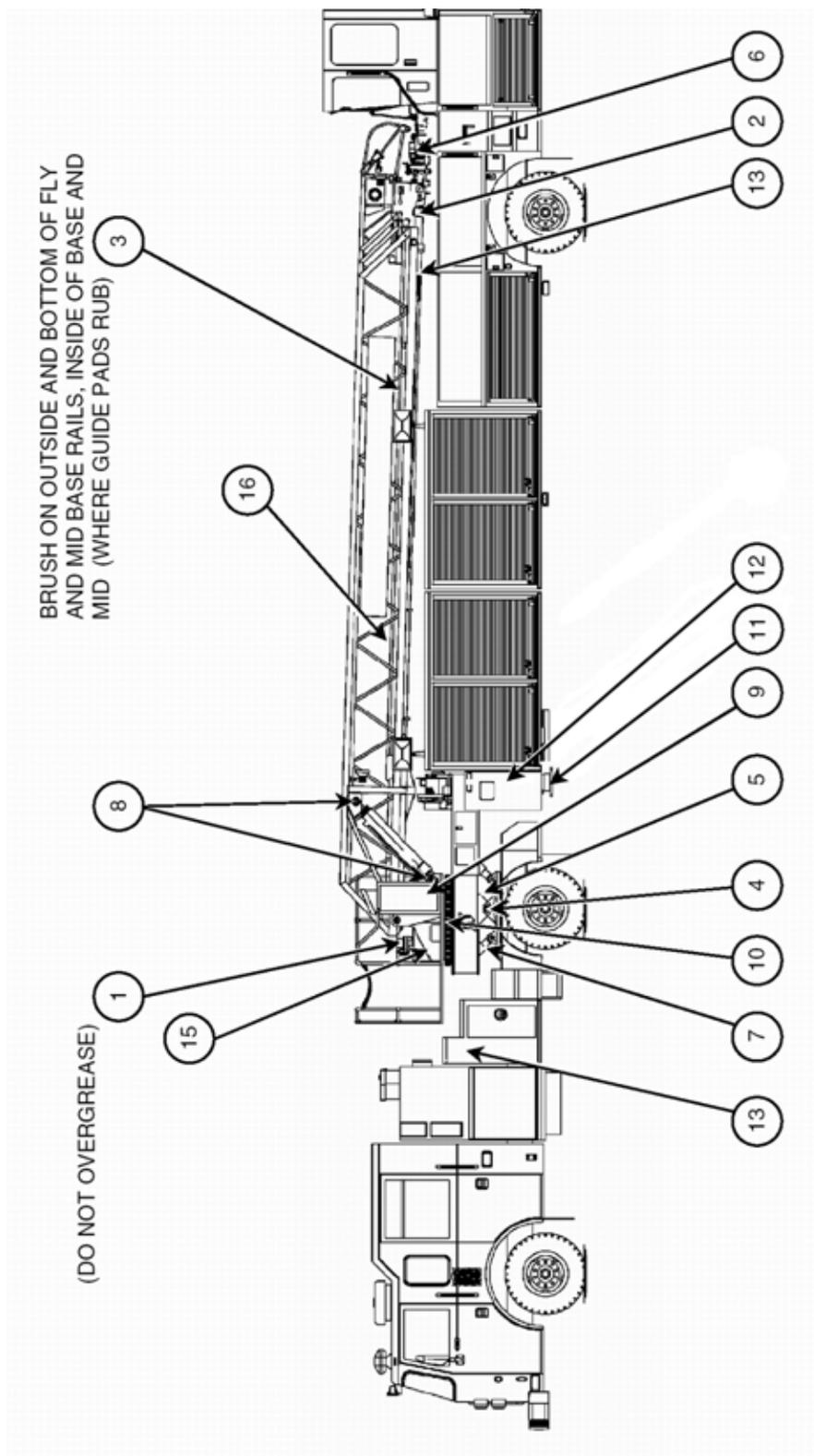
* "Lubricated" includes lubricants, lubricizing plating, and hardened washers.

4-12. Lubrication Specifications

Table 4-10: Lubrication Specifications

ITEM #	QTY	ITEM TO CHECK/SERVICE	TYPE OF LUBRICANT
1	1	WATER SWIVEL (Do not over-grease)	PIERCE MANUFACTURING CARTRIDGE #1003040 or SYNCO SUPER LUBE #41150 -or- PIERCE MANUFACTURING 5 lb TUB #1003044 or SYNCO SUPER LUBE #41050 -or- PIERCE MANUFACTURING 30 lb PAIL #1003046 or SYNCO SUPER LUBE #41030
2	3	WATERWAY BEARINGS	
3	—	LADDER SECTION	
4	2	FIFTH WHEEL PIVOT PIN	PIERCE MANUFACTURING CARTRIDGE PN #95-0903 - or - EXXON NLG1 No. 2 GRADE GREASE WITH MOLY - or - EQUIVALENT HEAVY-DUTY No. 2 GRADE GREASE WITH MOLY
5	1	FIFTH WHEEL BEARING (Additional information on the lubrication of this item can be found in <i>"3,000-Mile/Semi-Annual Lubrication"</i> on page 4-7.)	
6	1	MONITOR	
7	8	AXLE LOCKOUT CYLINDERS	
8	4	LIFT CYLINDER PINS	
9	1	TURNTABLE ROTATION BEARING	
10	1	ROTATION GEAR (Brush on)	
11	4	STABILIZER PAD SWIVEL JOINTS	
12	4	BOTTOM OF STABILIZER BEAMS (Brush on)	
13	—	WATERWAY TUBES (Wipe on waterway tubes)	
14	1	HYDRAULIC SYSTEM RESERVIOR	
15	1	ROTATION GEARBOX ON TURNTABLE	SEE HYDRAULIC OIL TAG ON RESERVIOR
16	—	WIRE ROPE CABLES	API-GL5 No. 80 OR 90 LUBRIPLATE CHAIN AND CABLE FLUID (OR EQUIVALENT)

Figure 4-2: Lubrication Points





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