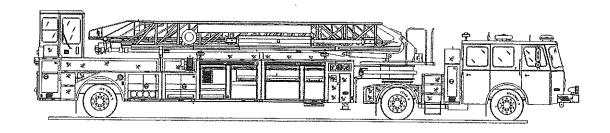
# Tiller

Training

Manual



## **OPERATOR**

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#### **FORWARD**

#### General

This manual has been prepared as a reference guide for the new operator as well as the experienced vehicle operator. Read this manual completely before attempting to operate the vehicle.

An Emergency One fire fighting apparatus is engineered for maximum versatility and dependability under a wide range of operating conditions.

The principles presented in this manual are limited to the facts related directly to operation of the apparatus, while the responsibility for application of these principles belongs to the Fire Department.

The efficiency of the Fire Department can be improved by periodically reviewing the information presented in this operator's manual and by holding 'hands-on' operational drills.

All directional references such as front, rear, left side and right side are as the part is viewed when seated in the cab driver's seat. The driver's side will be the left-hand side at all times.

Operator safety and the safety of personnel around the vehicle depends on the vehicle operators care and judgement when operating, servicing or maintaining the vehicle.

All information and specifications contained in this manual are based on the latest information available at the time of printing. Illustrations in this manual are intended for reference use only.

Emergency One reserves the right to discontinue or change specifications or designs at any time without prior notice and without incurring any obligation whatsoever.

This publication is provided for the use of *Emergency One* vehicle owners. Permission to reproduce all or any part of this publication must be obtained in writing from the *Emergency One* Customer Service Department.

#### SAFETY

#### General

- All personnel involved in the operation of the Emergency One Fire Fighting Vehicle (FFV) must follow the safety precautions and operating instructions detailed in this manual.
- Evaluate all procedures not covered in this manual prior to implementing.
   Ensure all safety precautions are considered.
- Do not modify the vehicle chassis or related equipment without prior written agreement from the Emergency One Customer Service Department.
- Unless а maintenance routine specifically states otherwise. shut down the engine and all other additional equipment prior to performing maintenance tasks.
- Do not smoke when refueling, servicing the fuel system, or working on the batteries.
- Remove the caps from battery cells prior to charging batteries (if applicable). Stored batteries emit highly explosive hydrogen gas when being charged.
- Isolate batteries from sparks and naked flames.
- Ensure working areas are free from oil, grease, and foreign material.
- Depressurize air, hydraulic and cooling system lines prior to removing or replacing any in-line components.

### American National Safety Standards

The symbols shown below are used throughout this publication to call your attention to areas in which carelessness or failure to follow specific procedures may result in personal injury, death, and/or component damage.

## A

THIS IS THE SAFETY ALERT SYMBOL. IT IS USED TO ALERT YOU TO THE POTENTIAL PERSONAL INJURY HAZARDS. OBEY ALL SAFETY MESSAGES THAT FOLLOW THIS SYMBOL TO AVOID POSSIBLE INJURY OR DEATH.

### **A** DANGER

DANGER INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

## **A** WARNING

WARNING INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

## ⚠ CAUTION

CAUTION INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY.

### $\Delta$ CAUTION

CAUTION USED WITHOUT THE SAFETY ALERT SYMBOL INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN PROPERTY DAMAGE.

## Entering, Exiting, and Climbing on Vehicles

- Ensure steps are firmly engaged in the weight bearing position prior to placing full weight on the step. Certain steps fold or pivot.
- Failure to exercise due care when entering and exiting vehicles can result in personal injury. Entry and exit should be made deliberately and carefully.
- Use a three-point stance when entering and exiting vehicles. Ensure three out of four extremities are in contact with the vehicle at all times.
- Face inward toward steps and handholds when entering and exiting.
- Keep steps and handholds in continuous good repair.
- Ensure all attaching bolts and hardware are secure.
- Keep steps, grab handles, and shoes free of grease and debris. Use extreme caution during inclement weather.

- Do not step or climb upon any vehicle surface unless it is slip resistant and handholds are provided.
- Do not stand on or near hose and hose couplings when a moving fire truck (pumper) is laying hose out of a vehicle. The hose may become snagged and caused to whip due to improper storage techniques or when the vehicle is negotiating a turn. Couplings may bounce as the hose is pulled from the truck and could cause injury. Serious injury may result if these instructions are not followed.
- Do not use water pump discharge outlets or suction inlets as steps. Do not use light bezels as steps. Personnel could slip, fall, and become injured as a result if these surfaces are used as steps.

#### Vehicle Operation

## A WARNING

BEFORE OPERATING AND RIDING IN THIS VEHICLE, READ ALL ATTACHED WARNING AND INSTRUCTION SIGNS, THE OPERATOR'S MANUAL, AND VEIW THE FAMILIARIZATION VIDEO (IF SUPPLIED). FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

#### General

- Operate or perform maintenance on the vehicle only if trained and authorized.
- Ensure that there is sufficient clearance in relation to buildings, structures, and other vehicles when operating the vehicle apparatus.

#### Hazard Warning Switch

- When pulled out, the hazard warning switch flashes both front and rear turn indicators.
- Pushing in on the hazard warning switch will turn the indicators off.
- Turn on the hazard warning switch to signify an emergency situation or a vehicle in distress.
- Prior to engaging the hazard warning, ensure that the turn indicator arm is in the central position.

#### Vehicle Backing

- Use a spotter to assist in backing the vehicle. Ensure the spotter is visible through the rear view or side mirrors.
- Establish hand or verbal signals prior to backing to prevent miscommunications.
- Have spotters use light wands and reflective vests at night to aid in backing.

#### Vehicle Control

- Ensure the vehicle has properly inflated tires for the terrain prior to operating. High pressure is desired for highway or hard surfaces. Low pressure is desired for off-road or soft surfaces.
- This vehicle is equipped with a neutral safety switch, which prevents engine start up while the transmission is in gear.
- If the vehicle does not start within 15 seconds, release the engine start button and allow the starter motor to cool for one minute and then repeat start up.

- Drivers must familiarize themselves with vehicle gauges, switches, and onboard switches prior to operating.
- Hold the steering wheel with both hands on opposite sides of the wheel.
- Always look 12-15 seconds ahead of where you are driving.
- Always brake into the turn then accelerate out of the turn.
- Do not brake with the wheels turned.
   The vehicle could become out of control and possibly roll over.
- Only apply brakes while wheels are maintaining traction.
- Ensure adequate distance between the vehicle you are driving and the vehicle ahead. Braking distances can double when the vehicle is loaded.
- Exercise extreme caution when shifting from wet to dry pavement. Loss of control and vehicle roll over can occur.
- Engage traction control prior to entering an area where it will be needed.
- Never engage engine brakes while driving on ice, snow, or slippery surfaces. Engine brakes can cause uncontrollable skids on slippery surfaces.
- Do not pump brakes on vehicles equipped with ABS. Anti-lock type brakes pulsate to prevent lock-up. Pumping brakes defeats the anti-lock function.
- Use extreme caution when accelerating or decelerating on unstable or slippery surfaces.

## A CAUTION

NEVER COAST THE VEHICLE DOWN HILL IN NEUTRAL. ALLOWING THE VEHICLE TO COAST IN NEUTRAL MAY RESULT IN SEVERE TRANSMISSION DAMAGE.

### riangle Caution

DO NOT ALLOW THE ENGINE TO OVERSPEED, OVERSPEEDING WILL RESULT IN ENGINE POWER TRAIN DAMAGE. THE ENGINE IS EQUIPPED WITH A RECORDER TO ANNOTATE MISUSE, NEGLIGENCE, AND MISAPPLICATION.

- When lane changing, stabilize the vehicle in a straight line prior to attempting further lane changes.
- Do not attempt high speed turns. Fire Fighting Vehicles maintain a high CG and could roll over at excessive speeds.
- If possible, do not drive with partial water loads. Unexpected and sudden shifts in weight during turning could cause vehicle instability.

#### Skidding

- If not equipped with ABS, brake evenly and release brakes until wheels regain traction.
- For all vehicles, turn wheels in desired direction then back quickly to regain control of the vehicle.

### Engine Exhaust

## **A** WARNING

CALIFORNIA PROPOSITION 65 WARNING STATES THAT DIESEL ENGINE EXHAUST AND SOME OF ITS CONSTITUENTS ARE KNOWN TO CAUSE CANCER, BIRTH DEFECTS, AND OTHER REPRODUCTIVE HARM.

## **⚠** WARNING

EXHAUST GASES ARE ODORLESS AND COLORLESS, AND IF INHALED IN A CONFINED SPACE WILL INDUCE UNCONSCIOUSNESS AND WILL CAUSE DEATH BY CARBON MONOXIDE POISONING.

- If exhaust fumes are suspected of entering the vehicle cab, rectify the defect immediately.
- If the vehicle has to be driven with a suspected exhaust leak, open all cab windows.
- Ensure the exhaust system, the vehicle air conditioning, and body ventilation systems are correctly maintained to prevent any exhaust fumes from entering into the cab.
- Replace defective parts with manufacturer's recommended parts only.
- Do not alter tail pipe orientation.
- All fire fighting vehicles manufactured by Emergency One are designed and equipped with noise suppression components, which conform to all applicable U.S. EPA Noise Control Regulations at the time the vehicle leaves Emergency One control.

- US Federal law prohibits removing or disabling noise suppression components for any purpose other than maintenance, repair, or replacement.
- U.S. Federal Law prohibits the use of the vehicle after any noise suppression device or element has been removed.

### Cooling System

- Ensure adequate clearance between the fan and the fan shroud.
- Do not alter the engine fan ratio, fan spacer dimensions, or fan positions.
- Verify correct operation of the fan clutch by ensuring that the fan is disengaged when engine cooling is not required.

#### Air Intake System

 Do not alter the inlet piping, outlet piping, or the location of the air cleaner under any circumstances.

#### Tires and Wheels

## **⚠ WARNING**

TIRE AND WHEEL ASSEMBLIES CAN SEPARATE WITH EXPLOSIVE FORCE IF NOT HANDLED CORRECTLY. SERIOUS INJURY OR DEATH CAN RESULT.

## **A WARNING**

LOOSE WHEEL NUTS CAN RESULT IN PREMATURE WHEEL FAILURE. KEEP NUTS TIGHT BY RETORQUING ON A REGULAR BASIS. USE THE CORRECT NUT TORQUE AND TIGHTENING SEQUENCE.

- Deflate tires prior to removing from the wheel rim.
- Do not operate vehicles with tires that are cut, gouged, unevenly worn, or improperly inflated. Replace severely worn or damaged tires immediately.
- Check wheel nut torque after 50-100 miles of operation following a wheel change.

#### Wheel Chocking

## **⚠** WARNING

FOR AERIAL VEHICLES, ENSURE THE WHEEL CHOCKS ARE SET EACH TIME THE VEHICLE TIRES LEAVE AND RETURN TO THE ROAD SURFACE. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY OR DEATH.

- Always chock the wheels when the vehicle is in a stationary firefighting mode. As a minimum, chock the rear wheels.
- Do not chock the wheels as a substitute for a well maintained brake system. Wheel chocks are only auxiliary devices to aid in vehicle retention when parked on steep grades, hills, or inclines.
- Not all wheel chocks perform the same. The wheel chocks used should be matched to the weight of the vehicle and tire size used. Wheel chocks not meeting the SAE height specification should be at least 50% of the specification height and used in pairs on pumpers and two pairs on aerials.
- Chock the downhill side with two chocks on two different tires on pumper and four chocks on four different tires on aerials.

#### Batteries

## **⚠** WARNING

CALIFORNIA **PROPOSITION** 65 WARNING STATES THAT BATTERY POSTS, TERMINALS, AND RELATED ACCESSORIES. CONTAIN LEAD AND LEAD ACID COMPOUNDS, CHEMICALS KNOWN THE TO STATE CALIFORNIA TO CAUSE CANCER AND REPRODUCTIVE HARM. WASH HANDS AFTER HANDLING.

#### Motor Vehicle Safety Standards

All US trucks built without a body will have a certification decal affixed to the left front door post. This decal displays paint color codes, axle ratings, and the vehicle identification number. Once the vehicle is completed by the manufacturer, another decal is affixed to the vehicle, certifying the vehicle meets all safety standards in effect at the time of its completion.

## Safety Practices

#### Compressed Air

- Use compressed air with less than 30 psi of air pressure for debris removal.
- Use protective eyewear and clothing when removing debris with compressed air. Using compressed air for removing debris creates an environment of propelled foreign particles.

### Personal Jewelry

Remove all rings, watches, jewelry, and any metallic objects prior to performing maintenance. Loose items may pose shock, burn, or moving machinery hazards.

### Protective Equipment

 Use protective clothing for the materials, procedures, and tools being used.

#### Chemicals and Cleaners

- Use only non-flammable solvents for cleaning component parts.
- Keep chemicals and cleaners in approved safety containers and in minimum quantities.
- Use approved protective equipment and clothing, such as gloves, apron, and eye protection, when handling chemicals and cleaners. Some chemicals have an adverse effect on skin and eyes.
- Ensure adequate ventilation when using chemicals and cleaners. Some chemicals have an adverse affect on the respiratory tract.
- Observe all manufacturer's warning labels and current safety directives.
- Use chemicals and cleaners in authorized areas only.
- Dispose of all soiled clothes and materials in accordance with EPA and local directives for hazardous waste.

#### SEAT ADJUSTMENTS

## **⚠** WARNING

DO NOT ADJUST DRIVER'S SEAT WHILE VEHICLE IS MOVING. THE SEAT COULD SUDDENLY OR UNEXPECTEDLY MOVE CAUSING THE DRIVER TO LOSE CONTROL OF VEHICLE.

## **A** WARNING

DO NOT WEAR HELMETS IN CAB. SERIOUS INJURY MAY RESULT.

### riangle warning

SEAT HEIGHT ADJUSTMENTS MUST BE MADE TO COMPENSATE FOR SEAT SUSPENSION MOVEMENT SO ADEQUATE HEAD CLEARANCE IS ATTAINED. FAILURE TO DO SO CAN RESULT IN INJURY.

## riangle Caution

OPERATING THIS VEHICLE **OVER** ROUGH ROADS OR SURFACES CAN RESULT IN PERSONAL INJURY. USE CAUTION AND REDUCE SPEED. PROPERLY ADJUSTED SEATS AND SEATING SYSTEM MAY NOT **COMPENSATE** COMPLETELY **FOR** SEVERE ROAD CONDITIONS.

#### NOISE HAZARDS

 Fire fighting is a dangerous occupation that exposes workers to a variety of conditions detrimental to hearing, including sirens, air horns, large engines, machinery, loud noise from fires, explosions, and other equipment.

## **⚠** WARNING

THIS VEHICLE IS EQUIPPED WITH AUDIBLE WARNING DEVICES THAT CREATE A LOUD NOISE TO CLEAR TRAFFIC. THERE MAY BE LOCAL AND STATE LAWS IN YOUR **AREA** GOVERNING THE USE OF THESE DEVICES. DO NOT OPERATE THE SIRENS OR AIR **HORNS** WITH PERSONNEL STANDING N THE **IMMEDIATE VICINITY (WITHIN 50 FEET)** OF THE FRONT PARAMETER OF THE VEHICLE. FAILURE TO FOLLOW THIS CAUTION MAY RESULT IN INJURY. DEATH, OR SEVERE HEARING LOSS.

2. EMERGENCY ONE recommends that all fire departments institute a hearing conservation program to monitor the hearing levels of their fire/rescue personnel. In addition, all fire departments should regularly measure the total noise dose experienced by their fire/rescue personnel to determine if the amount of sound in the working environment creates the possibility for noise induced hearing loss.

### **A WARNING**

THE INTERIOR CAB NOISE LEVEL NFPA COMPLIES WITH 1901 GUIDELINES. THE INTERIOR NOISE LEVEL IS BELOW 90 dba WHEN **NFPA TESTED** BY PROCEDURES. SIRENS AND AIR **HORNS** ACTIVATED, THE NOISE LEVEL IS 94-98 dba.

#### **UNDERCARRIAGE**

## **A** CAUTION

PERSONNEL ENTERING THE UNDERSIDE OF THE VEHICLE MUST USE CAUTION WHEN DOING SO. FAILURE TO DO SO COULD RESULT IN SEVERE INJURY OR DEATH.

- Personnel must use caution when crawling under the vehicle chassis. Hazards such as rotating drivelines, PTO shafts, hot exhaust, pumps dumping hot steam or chemicals, and movement of the vehicle are the most common hazards.
- 2. Personnel should notify others of their intentions of crawling under the vehicle chassis beforehand.

#### Covers and Doors

## riangle Caution

THE ALUMINUM HOSE BED COVER IS **HEAVY AND IS EFFECTED BY STRONG** WINDS AND THE GRADE THE VEHICLE PARKED ON. THE VEHICLE SHOULD BE PARKED ON LEVEL GROUND WHEN THE COVER IS LIFTED. DO NOT LIFT THE COVER IN STRONG WINDS. USE TWO PEOPLE TO LIFT THE COVER. MAKE SURE THE COVER RESTRAINING DEVICES ARE IN PLACE AND SECURED BEFORE RELEASING THE HOLD OF THE COVER. MAKE SURE PERSONNEL HAVE A SECURE HOLD OF THE COVER WHEN RELEASING THE RESTRAINT DEVICE. FAILURE TO **FOLLOW** THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY.

- Use caution when opening and closing doors on the vehicle. Do not stand, climb, sit, or hang on open doors. Use caution when opening and closing compartment and cab doors. Some doors are spring loaded and will close automatically and if not observed, injuries to fingers and/or hands may occur.
- 2. Do not drive away with doors open or partially closed.

#### VEHICLE CARRYING CAPACITY

### A CAUTION

WHEN **EQUIPPING** THE NEW APPARATUS, CARE SHOULD BE TAKEN NOT TO EXCEED THE FRONT AND REAR AXLE CAPACITY RATINGS LISTED ON THE LABEL AFFIXED TO THE DRIVER'S DOOR OR DOOR POST. IF THE EQUIPMENT TO BE INSTALLED EXCEEDS 2,500 LBS. IN WEIGHT, THE LOADED VEHICLE SHOULD BE WEIGHED **VERIFY** TO WHAT ADDITIONAL CARRYING CAPACITY (IF ANY) IS AVAILABLE FOR ADDITIONAL EQUIPMENT. EMERGENCY RECOMMENDS THAT NEW ALL VEHICLES BEING PLACED INTO SERVICE BE WEIGHED TO VERIFY COMPLIANCE WITH THE AXLE GVW RATINGS. **EMERGENCY ONE ALSO** RECOMMENDS THAT THE IN-SERVICE VEHICLE BE WEIGHED ANNUALLY TO **VERIFY GVW** COMPLIANCE ADDITONAL EQUIPMENT HAS BEEN ADDED DURING THE LIFE OF THE VEHICLE.

- 1. This vehicle is designed to meet the requirements of NFPA 1901-1999 Section 10-1 and 10-1.1. The Gross Vehicle Weight Rating (GVVVR) of the vehicle is capable of carrying the weight of the unequipped apparatus, the fully loaded water tank, (if so equipped) fuel and other tanks, the specified hose load, (if so equipped), unequipped personnel weight, ground ladders, and a miscellaneous equipment allowance of 2,500 lbs.
- 2. The unequipped personnel allowance is calculated at 200 lbs. per person by the number of seating positions on the vehicle. The 2,500 lb. equipment allowance is determined by the following table (The table is derived from table 10-1, section 10-1 NFPA 1901-1999 standard). It should be noted that generators, cord reels, and other permanently mounted equipment is considered part of the miscellaneous equipment allowance.

#### **AERIAL SAFETY**

- To ensure safe and efficient usage, all personnel involved in the operation of the EMERGENCY ONE Fire Fighting Vehicle (FFV) should follow the safety precautions and operating instructions detailed in this manual.
- 2. Any procedure not specified in this manual should be thoroughly evaluated with regard to safety before being implemented.

## riangle Warning

DO NOT WELD, DRILL, OR MODIFY RELATED THE AERIAL OR WITHOUT **PRIOR** EQUIPMENT FROM WRITTEN CONSENT THE **ENGINEERING EMERGENCY** ONE DEPARTMENT.

- 3. Only trained and authorized personnel should operate the vehicle or perform maintenance tasks.
- 4. Inspect the aerial, waterway piping, outriggers, cables, and hydraulic system daily, and especially after use.
- 5. Keep the aerial device properly adjusted and lubricated.
- Stop aerial operations when cleaning, adjusting, lubricating, or servicing.
- 7. If the aerial makes accidental contact with any energized electrical lines, do not allow any person on the ground to touch the vehicle. Personnel on the vehicle or aerial will become the same voltage potential as the electrical wire.

## riangle warning

THE AERIAL ASSEMBLY IS NOT INSULATED. KEEP THE AERIAL AT LEAST TEN 100 1100 FROM OVERHEAD POWER LINES. WHEN ELEVATING THE AERIAL NEAR POWER LINES, PERSONNEL ON THE GROUND SHOULD STAND CLEAR OF THE VEHICLE. AND AVOID STEPPING ON TO TOUCHING THE VEHICLE UNTIL SAFE THE AERIAL IS IN Α POSITION WITH RESPECT TO THE **OVERHEAD** POWER LINES. **PERSONNEL** TOUCHING THE GROUND AND THE VEHICLE, WITH THE AERIAL TOUCHING AN ENERGIZED POWER LINE, WILL **BECOME A PATHWAY TO GROUND** FOR ELECTRICAL CURRENT. RESULTING IN SEVERE INJURY OR DEATH.

8. It is extremely important for personnel not to touch the ground. It is recommended that personnel stay on the vehicle and wait for the power to be turned off. If emergency conditions dictate leaving the vehicle, jump completely clear of the vehicle. Do not step off.

## **⚠** WARNING

THE OPERATOR POSITIONED AT THE CONTROL STATION SHOULD ANTI-STAND ON THE **ELECTROCUTION PLATFORM** ANYTIME THE AERIAL STANDING ON THE OPERATED. ANTI-ELECTROCUTION PLATFORM WILL RAISE THE OPERATOR OFF THE GROUND, PREVENTING THEM FROM BEING A PATHWAY **GROUND FOR** ELECTRICAL CURRENT IN THE EVENT THE CONTACTS **AERIAL** ANY ENERGIZED POWER LINE.

 The operator positioned at the control station should stand on the antielectrocution platform any time the aerial is in operation.

**NOTE:** The anti-electrocution platform slides out from the underside of the vehicle, under the rubrail at the pump control station.

- 10. Standing on the anti-electrocution platform keeps the control panel operator off the ground, and prevents the operator from becoming a pathway to ground for electrical current if the ladder contacts an energized power line.
- 11. Ensure axes, pike poles, folding ladders, equipment stowed at the tip and sides of the aerial device are secure, especially after use.

## $\Delta$ CAUTION

MAKE SURE AREA IS CLEAR WHEN RETRIEVING PIKE POLES AND LADDERS FROM VEHICLES.

12. Do not operate the aerial during a lightning storm.

## riangle Warning

IF ON SCENE EMERGENCY CONDITIONS DICTATE THE AERIAL BE USED DURING A LIGHTING STORM, EXTREME CAUTION SHOULD BE EXERCISED DURING OPERATION TO AVOID SEVERE PERSONAL INJURY.

- 13. Stand clear of any hydraulic ruptures in the pressurized hydraulic system. STOP, and do not attempt operations until repairs are completed.
- 14. Do not leave the operator's control station unattended while the aerial device is in the raised or extended position. Return the aerial to the stowed position before leaving the control panel.

- 15. Do not raise, rotate, or extend the aerial until the outriggers are properly set. Position the vehicle on stable ground, with the outriggers in the proper position before operating.
  - NOTE: Normal function of the interlock system will not allow operation of the aerial until outriggers are properly set.
- 16. Always operate the controls smoothly to avoid jerky and erratic movement, causing the ladder to whip and bounce.
- 17. Avoid rotating the aerial over the heads of personnel on the ground.
- 18. Never move the vehicle with the aerial out of the stowed position. With the aerial raised or extended and the vehicle in motion, the aerial and support structure could be subjected to excessive strain.
- 19. Ensure all personnel stand clear when extending or retracting outriggers. Always retract outriggers completely before moving the vehicle.
- 20.Be constantly aware of the vehicle and aerial dimensions to establish sufficient clearance in relationship to building structures, other vehicles, etc., when operating in the stowed position and while traveling.
- 21. Never use the aerial as a crane, or as a leverage or ramming device.
- 22. Before initiating extension, elevation, or rotation functions, ensure the area in the direction of movement is clear of obstructions and personnel.
- 23. Do not exceed load capabilities. Refer to the Safe Load and Reach charts provided with this vehicle.

## **⚠** WARNING

MOVING MACHINERY. PERSONNEL MUST STAND ON PLATFORM DURING OPERATION AND KEEP EXTREMITIES CLEAR OF MOVING PARTS. DO NOT EXTEND OR RETRACT WITH PEOPLE ON AERIAL. DO NOT STAND UNDER AERIAL DURING OPERATION. SERIOUS INJURY OR DEATH MAY RESULT.

24. Do not allow personnel to climb the aerial during operation. The aerial should be in a stationary position before climbing.

## $\Delta$ warning

DO NOT ALLOW PERSONNEL ON THE END OF A MOVING AERIAL UNLESS THEY ARE SECURED TO THE AERIAL WITH A PERSONAL PROTECTIVE SAFETY BELT.

- 25. The operator should be careful not to cause a whipping or bouncing motion to the extended aerial. The resultant whipping action could throw personnel off the aerial device.
- 26. Use the aerial assembly in a cantilevered positioned only. Do not power the aerial down on windows or roofs. Position the aerial device approximately 6-12" above a structure, and allow the weight of personnel to deflect the aerial near the structure.
- 27. Powering down on a structure could cause permanent damage in the aerial assembly.

## riangle warning

DO NOT MAKE CONTACT WITH ANY STRUCTURE USING THE AERIAL ASSEMBLY.

- 28.Do not use the aerial as a battering ram to knock out windows, tip over walls, or ventilate roofs, damage to the aerial assembly could result.
- 29. Use approved tie off points for repelling on the aerial device. Avoid impulse loads from sudden stops while repelling from the aerial device.
- 30. When operating the aerial assembly at night, ensure the operator control station and aerial are well lighted. Two deck lights are supplied at the sides of the aerial at the main rail height.
- 31. When operating in cold climates, always drain the waterway after use to prevent water freeze up, or damage to the waterway could result.
- 32. With the monitor and the rear drain completely open, raise the aerial to its maximum elevation to allow water to drain from the slip joint and connecting tube (AERIAL ONLY).
- 33. The platform manifold is drained using the two 1/4 turn drain valves located at both rear corners of the platform (PLATFORMS ONLY).

**NOTE:** The aerial must be in the extended position. Full extension is required to complete platform draining procedures (PLATFORMS ONLY).

34. The waterway valve will drain completely when the aerial master power switch is turned off (PLATFORMS ONLY).



E-One Pubs No. 54222A

#### TILLER SAFETY

- 1. To ensure safe and efficient usage, all personnel involved in the operation of the EMERGENCY ONE Fire Fighting Vehicle (FFV) should follow the safety precautions and operating instructions detailed in this manual.
- 2. Any procedure not specified in this manual should be thoroughly evaluated with regard to safety before being implemented.



DO NOT WELD, DRILL, OR MODIFY
THE AERIAL OR RELATED
EQUIPMENT WITHOUT PRIOR
WRITTEN CONSENT FROM THE
EMERGENCY ONE ENGINEERING
DEPARTMENT.

- 3. Only trained and authorized personnel should operate the vehicle or perform maintenance tasks.
- 4. Inspect the aerial, waterway piping, outriggers, cables, and hydraulic system daily, and especially after use.
- 5. Keep the aerial device properly adjusted and lubricated.
- 6. Stop aerial operations when cleaning, adjusting, lubricating, or servicing.
- 7. If the aerial makes contact with any energized electrical lines, do not allow any person on the ground to touch the vehicle with any person on it. Personnel on the vehicle or aerial will become the same voltage potential as the electrical wire.

## **A** WARNING

THE AERIAL ASSEMBLY IS NOT INSULATED. KEEP THE AERIAL AT LEAST TEN FEET FROM OVERHEAD POWER LINES. WHEN ELEVATING THE AERIAL NEAR POWER LINES, PERSONNEL ON THE GROUND SHOULD STAND CLEAR OF THE VEHICLE, AND AVOID STEPPING ON TO OR TOUCHING THE VEHICLE UNTIL THE AERIAL IS IN A SAFE POSITION WITH RESPECT TO THE OVERHEAD POWER LINES. PERSONNEL **TOUCHING THE GROUND AND THE** VEHICLE, WITH THE AERIAL **TOUCHING AN ENERGIZED POWER** LINE, WILL BECOME A PATHWAY TO GROUND FOR ELECTRICAL CURRENT. RESULTING IN SEVERE INJURY OR DEATH.

8. It is extremely important for personnel not to touch the ground. It is recommended personnel stay on the vehicle and wait for the power to be turned off. If emergency conditions dictate leaving the vehicle, jump completely clear of the vehicle, do not step off.

## **A** WARNING

THE OPERATOR POSITIONED AT THE CONTROL STATION SHOULD STAND ON THE ANTI-ELECTROCUTION PLATFORM ANYTIME THE AERIAL IS OPERATED. STANDING ON THE ANTI-ELECTROCUTION PLATFORM WILL RAISE THE OPERATOR OFF THE GROUND, PREVENTING THEM FROM BEING A PATHWAY TO GROUND FOR ELECTRICAL CURRENT IN THE EVENT THE AERIAL CONTACTS ANY ENERGIZED POWER LINE.



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9. The operator positioned at the control station should stand on the anti-electrocution platform any time the aerial is in operation.

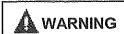
**NOTE:** The anti-electrocution platform slides out from the underside of the vehicle, under the rubrail at the pump control station.

- 10. Standing on the anti-electrocution platform keeps the control panel operator off the ground, and prevents the operator from becoming a pathway to ground for electrical current if the ladder contacts an energized power line.
- 11. Ensure axes, pike poles, folding ladders, equipment stowed at the tip and sides of the aerial device are secure, especially after use.



MAKE SURE AREA IS CLEAR WHEN RETRIEVING PIKE POLES AND LADDERS FROM VEHICLES.

12. Do not operate the aerial during a lightning storm.



IF ON SCENE EMERGENCY
CONDITIONS DICTATE THE AERIAL BE
USED DURING A LIGHTING STORM,
EXTREME CAUTION SHOULD BE
EXERCISED DURING OPERATION TO
AVOID SEVERE PERSONAL INJURY.

13. Stand clear of any hydraulic ruptures in the pressurized hydraulic system. STOP, and do not attempt operations until repairs are completed.

- 14. Do not leave the operator's control station unattended while the aerial device is in the raised or extended position. Return the aerial to the stowed position before leaving the control panel.
- 15. Do not raise, rotate, or extend the aerial until the outriggers are properly set. Position the vehicle on stable ground, with the outriggers in the proper position before operating.

**NOTE:** Normal function of the interlock system will not allow operation of the aerial until outriggers are properly set.

- 16. Always operate the controls smoothly to avoid jerky and erratic movement, causing the ladder to whip and bounce.
- 17. Avoid rotating the aerial over the heads of personnel on the ground.
- 18. Never move the vehicle with the aerial out of the stowed position. With the aerial raised or extended and the vehicle in motion, the aerial and support structure could be subjected to excessive strain.
- 19. Ensure all personnel stand clear when extending or retracting outriggers. Always retract outriggers completely before moving the vehicle.
- 20. Be constantly aware of the vehicle and aerial dimensions to establish sufficient clearance in relationship to building structures, other vehicles, etc., when operating in the stowed position and while traveling.
- 21. Never use the aerial as a crane, or as a leverage or ramming device.
- 22. Before initiating extension, elevation, or rotation functions, ensure the area in the direction of movement is clear of obstructions and personnel.



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23. Do not exceed load capabilities. Refer to the Safe Load and Reach charts provided with this vehicle.



MOVING MACHINERY. PERSONNEL MUST STAND ON PLATFORM DURING OPERATION AND KEEP EXTREMITIES CLEAR OF MOVING PARTS. DO NOT EXTEND OR RETRACT WITH PEOPLE ON AERIAL. DO NOT STAND UNDER AERIAL DURING OPERATION. SERIOUS INJURY OR DEATH MAY RESULT.

24. Do not allow personnel to climb the aerial during operation. The aerial should be in a stationary position before climbing.

## **A** WARNING

DO NOT ALLOW PERSONNEL ON THE END OF A MOVING AERIAL UNLESS THEY ARE SECURED TO THE AERIAL WITH A PERSONAL PROTECTIVE SAFETY BELT.

- 25. The operator should be careful not to cause a whipping or bouncing motion to the extended aerial. The resultant whipping action could throw personnel off the aerial device.
- 26. Use the aerial assembly in a cantilevered positioned only. Do not power the aerial down on windows or roofs. Position the aerial device approximately 6-12" above a structure, and allow the weight of personnel to deflect the aerial near the structure.
- 27. Powering down on a structure could cause permanent damage in the aerial assembly.

## **A** WARNING

# DO NOT MAKE CONTACT WITH ANY CONTACT WITH ANY STRUCTURE USING THE AERIAL ASSEMBLY.

- 28. Do not use the aerial as a battering ram to knock out windows, tip over walls, or ventilate roofs, damage to the aerial assembly could result.
- 29. Use approved tie off points for repelling on the aerial device. Avoid impulse loads from sudden stops while repelling from the aerial device.
- 30. When operating the aerial assembly at night, ensure the operator control station and aerial are well lighted. Two deck lights are supplied at the sides of the aerial at the main rail height.
- 31. When operating in cold climates, always drain the waterway after use to prevent water freeze up, or damage to the waterway could result.
- 32. Do not extend the cradled ladder until sufficient clearance of the tiller cab is observed. An alarm will sound and a light will illuminate on the turntable control console if the ladder is not completely clear of tiller cab zone.
- 33. Do not swing an extended ladder until sufficient clearance of the tiller cab is observed.
- 34. Do not operate ladder with the tillerman in the cab. The tiller cab must be empty of personnel before aerial operations can take place.
- 35. Vehicle and tillerman drivers must be experienced in the buzzer system before operating the vehicle.



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- 36. The tiller axle lockplate must be installed prior to transporting the vehicle should a tillerman not be utilized.
- 37. Check tiller wheels for alignment to prevent "dogtracking" before moving the vehicle.
- 38. During extended road travel, check tiller axle lug nuts frequently.
- 39. The vehicle is equipped with a tillerman jacknife alarm. Two lights are located in the driver and tillerman cabs. The amber light will illuminate when the vehicle is approaching an 85 degree angle. The red light will illuminate and an audible buzzer will sound when the tiller has exceeded the 85 degree angle. Stop vehicle operations immediately and correct the situation.
- 39. With the monitor and the rear drain completely open, raise the aerial to its maximum elevation to allow water to drain from the slip joint and connecting tube (AERIAL ONLY).
- 40. The platform manifold is drained using the two 1/4 turn drain valves located at both rear corners of the platform (PLATFORMS ONLY).

**NOTE:** The aerial must be in the extended position. Full extension is required to complete platform draining procedures (PLATFORMS ONLY).

41. The waterway valve will drain completely when the aerial master power switch is turned off (PLATFORMS ONLY).



E-One Pubs No. 54034

### **Aerial Hydraulic Activation System**

A hydraulic fixed displacement pump system is provided to power all outrigger and aerial functions with direct control stations provided for each system. The hydraulic pump system is driven off the engine driven power steering pump with activation switch located on the cab dash within easy reach of the driver. A system "engaged" indicator light is provided on the activation switch. This hydraulic pump system allows aerial system to be activated without having to shut down the water pump or reduce engine RPM's.

To activate, perform the following:

- 1. Place transmission to neutral.
- 2. Engage parking brake.
- 3. Activate the AERIAL PTO switch located on the cab dash panel.
- Observe the AERIAL ENGAGE light for illumination on the Kysor warning panel.
- Perform standard aerial setup operations.

# PTO SHIFTING PROCEDURE & PRECAUTIONS

#### **A** CAUTION

THIS VEHICLE IS EQUIPPED WITH A POWER TAKE-OFF. SHUT ENGINE OFF BEFORE WORKING ON POWER TAKE-OFF OR GETTING BELOW VEHICLE.

#### **OPERATION**

1. Engage PTO with engine at idle speed (Automatic Transmission with Power Shift PTO)

 Power Shift PTO's: Engine must be at idle or below 1000 rpm when PTO is engages. See transmission manufacturer's instructions for special procedures.

#### **A** IMPORTANT

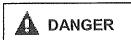
FAILURE TO FOLLOW PROPER SHIFTING OR OPERATING SEQUENCES WILL RESULT IN PREMATURE PTO FAILURE WITH POSSIBLE DAMAGE TO OTHER EQUIPMENT.



E-One Pubs No. 54236A

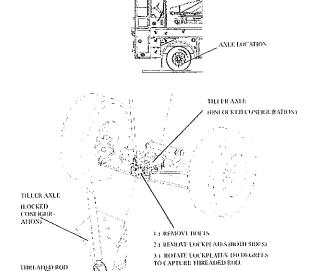
## Roading the Tiller

Roading the tiller involves a procedure where the tiller is transported without the tillerman in the tiller cab over long distances.



NEVER ATTEMPT TO DRIVE AWAY WITHOUT EITHER A TILLERMAN IN THE TILLER CAB OR THE LOCKPLATES INSTALLED ON THE TILLER AXLE. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.

- 1. To road the tiller, perform the following:
- 2. Ensure the tiller wheels are straight and not turned to the right or left. Verify rear wheels are aligned to prevent "dogtracking".
- Located on the tiller axle, remove the attaching bolts and lockplates mounted at the steering box and rotate 90 degrees (see illustration).
- Ensure the threaded rods are protruding through the access hole at the top of the plates. Reinstall the mounting bolts (see illustration).
- 5. Stow monitor 90 degrees with the centerline of the cradle to prevent damage to the tiller cab.
- Retract aerial and stow in cradle.
- 7. Stow outriggers before moving vehicle.
- Unless actually driving the tiller, riding in the tiller cab during transport is prohibited.



**NOTE:** This procedure must also be performed anytime the tiller is to be towed.

REINSTALL BOLES

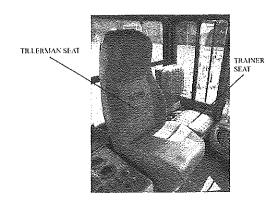


E-One Pubs No. 54235A

## **Tiller Cab Operations**

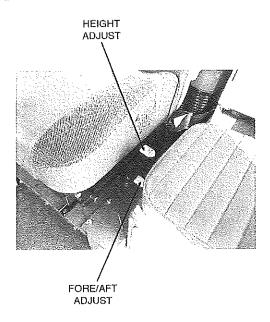
### Cab Seating

The tiller cab is equipped with a 911 mechanically adjustable seat and a non-adjustable trainer seat.



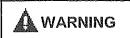
#### Seat Adjustments

Seat adjustments can be made by two levers on the left side of the seat. One is for height adjustments and one is for fore/ aft adjustments. Observe all precautions before adjustments are made in VEHICLE SAFETY.

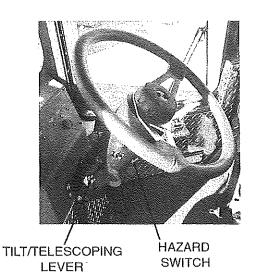


### Tiller Steering

Tiller cab steering consists of a tilt/telescoping steering wheel.



ENSURE THAT THE STEERING WHEEL IS LOCKED BEFORE ATTEMPTING TO DRIVE THE TILLER. NEVER ATTEMPT TO ADJUST THE STEERING WHEEL WHILE THE TILLER IS IN MOTION. LOSS OF TILLER CONTROL, PERSONAL INJURY, OR DEATH COULD RESULT.



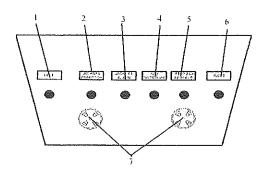
### Adjustments

The steering can be adjusted by the tilt/telescoping lever on the left side of the column. Pull up on the lever to tilt the wheel. Push down on the lever to telescope the steering column up or down. Release the lever in both cases to lock wheel in position..



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### Dash Layout



- 1. LEFT TURN INDICATOR
- 2. JACKNIFE APPROACH LIGHT
- 3. JACKNIFE ALARM LIGHT
- 4. CAB DOOR AJAR
- 5. STOP/GO/BACKUP INDICATOR
- 6. RIGHT TURN INDICATOR
- 7. WARNING BUZZERS

#### Left Turn Indicator (1)

This light will illuminate if the vehicle is making a left turn.

## Jack Knife Approach Light (2)

This amber light will illuminate when the tiller approaches the 85 degree angle.

#### Jack Knife Alarm (3)

This red light will illuminate and a buzzer will sound when the tiller has exceeded the 85 degree angle and the point of jacknifing is imminent.

## Cab Door Ajar (4)

This light will illuminate if any door on the vehicle is not properly closed.

### Stop/Go/Backup Light (5)

This light will illuminate anytime the Stop/Go/Backup switch in the front vehicle cab is activated.

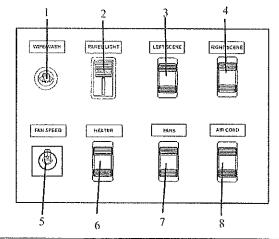
#### Right Turn indicator (6)

This light will illuminate anytime the vehicle is making a right hand turn.

#### Warning Buzzers (7)

These buzzers will sound with the corresponding light on the dash panel.

### Right Console Layout



- 1. WIPER/WASHER SWITCH
- 2. PANEL LIGHT SWITCH
- 3. RIGHT SCENE LIGHT
- 4. LEFT SCENE LIGHT
- 5. FAN SPEED SWITCH
- 6. HEATER SWITCH
- 7. FANS SWITCH
- 8. AIR CONDITIONING



E-One Pubs No. 54235A

### Wiper/Washer Switch (1)

The Windshield Wiper Switch located on the tiller panel operates the windshield wipers and washers. The wipers can be operated in intermittent, low, and high speeds. Push in the switch to dispense windshield washer fluid.

### Panel Light Switch (2)

The Panel Lights Switch located on the tiller panel when operated illuminates the dash panel. The oscillating switch can brighten or dim the instrument panels.

### Right Scene Light (3)

This switch will activate the right scene lights located on the tiller.

### Left Scene Light (4)

This switch will activate the left scene lights located on the tiller.

### Fan Speed Switch (5)

This switch controls the fan speed in the tiller cab.

#### Heater Switch (6)

This switch activates the heater in the tiller cab.

#### Fans Switch (7)

This switch activates the fans in the tiller cab.

#### Air Conditioning (8)

This switch activates the air conditioner.



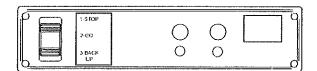
E-One Pubs No. 54237A

## **Tiller Communications**

Communications between the vehicle and tillerman driver are important. The following devices aid in communicating.

#### Vehicle Cab

The Stop/Go/Backup switch is located on the indicator panel in the cab. A directional placard and an audible buzzer are also supplied. By momentarily pressing the switch, the signal is relayed to the tillerman.



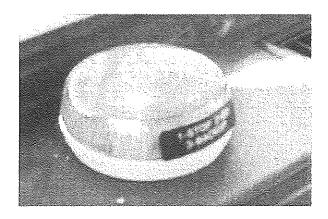
The tillerman acknowledges the front driver signal by pressing on the footswitch

located on the tiller cab floor.

#### Tiller Cab

An indicator light is located on the tiller dash. A red warning light and buzzer alerts the tillerman the front cab driver is making a stop, go, or back up movement.

Additionally, two amber lights are mounted on top of the driver's cab to alert the tiller driver of a stop or turning movement.





E-One Pubs No. 54285A

## **AMPS Hydraulic Generator**

### Description

An AMPS 6KW-20KW hydraulic generator is installed on the vehicle. The unit is equipped with modular generator unit (which includes the hydraulic motor and filter, generator, and cooler), variable displacement hydraulic pump with soft start, hydraulic reservoir and quadmeter. The quadmeter consists of one (1) voltmeter/hourmeter, one (1) frequency meter, and two (2) ammeters.

The hydraulic motor, generator, blower, cooler, and necessary hydraulic components are enclosed in a stainless steel housing. The housing is lined with acoustical material to reduce noise levels.

The hydraulic pump with the soft start is driven by a chassis transmission mounted power take off (PTO).

A guarded PTO disengage switch is mounted in cab to disengage the PTO.

A switch is mounted as specified to turn on the exciter circuit of the generator to produce electrical power.

### Ratings and Capacity

Rating:

6,000, 8,000, 10,000,

15,000 and 20,000 watts

continuous

Volts:

120/240 volts

Phase:

Single phase 4 wire

Frequency:

60 Hz domestic 50Hz

International

Amperage:

50, 68, 84, 126, and 168

amps @ 120 volts or 25, 34, 42, 63 and 84 amps @ 240 volts respectively

Engine speed at

Recommend below 1200

RPM

engagement:

Operation

975 to 2500 RPM

range:

600 to 2500 RPM Aerial

Only

Reservoir

2.9 US Gallons

Fluid

Capacity:

The generator is tested operating at 100 percent of its name plate voltage for a minimum of 2 hours in accordance with current N.F.P.A. 1901 standards.

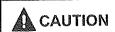


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Safety



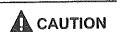
Do not restrict airflow to generator. Failure to comply may result in damage to equipment.



Use only Dextron II-E or Dextron III hydraulic oil in generator reservoir. Failure to comply may result in damage to equipment.



Do not let air discharge re-circulate to air inlet. Failure to comply may result in damage to equipment.



Air exiting from generator exhaust is hot. Do not touch generator housing or come in contact with discharge air. Failure to comply may result in personal injury.

### Operation

- 1. Bring engine to operating speed and temperature.
- 2. Turn on PTO switch in cab.
- 3. Turn on exciter switch (located as specified).



Shut down generator and troubleshoot high and low frequency problems per Service Manual. Failure to comply may result in damage to equipment.

4. Ensure the frequency is between 59 and 61 Hz on 60 Hz models and 49 and 51 Hz on 50 Hz models.



Shut down generator and troubleshoot high and low voltage problems per Service Manual. Failure to comply may result in damage to equipment.

- 5. Ensure the voltage is between 230V and 250V. **NOTE:** The 15KW and 20KW models may have lower than normal voltage until load is applied. Voltage will increase as the load increases.
- Operate AC accessories per 110V/220V operating instructions.



E-One Pubs No. 54225A

#### INTRODUCTION

- The EMERGENCY ONE HP100' tiller is designed for aerial fire fighting. The aerial capabilities allow the vehicle to respond in a timely manner to accident sites which might be inaccessible to standard equipment.
- 2. The vehicle is designed for maximum stability and maneuverability under all operating conditions.
- The fire fighting system is comprised of easy to use component systems and is designed for easy operation.
- 4. The aerial consists of three welded extruded aluminum telescopic aerial sections operating from -6 degrees to 76 degrees and is designed to provide continuous egress for firefighters and civilians from an elevated position to the ground.
- 5. The aerial device has a vertical height of 100' at full extension and elevation.
- 6. The rated horizontal reach is 91.5'. The measurement is from the outermost rung at full extension to the centerline of turntable rotation.
- 7. The aerial has a maximum stabilizer spread of 18' from pin to pin.

#### Aluminum Aerial Device

 To insure a high strength to weight ratio and an inherent corrosion resistance, the aerial device is completely constructed high strength aluminum. All side rails, rungs, handrails, uprights and K-braces are made of structural 6061T6 alloy aluminum extrusions.  Due to the unpredictable nature of fire ground operations, a minimum safety factor of 2.5 to 1 is desired. This structural safety factor applies to all structural aerial components including turntable and torque box stabilizer components.

**DL** = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.

**RL** = Rated capacity stress. Stress produced by the rated capacity load of the ladder.

**WL=** Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.

**FY** = Material yield strength. The stress at which material exhibits permanent deformation.

 $2.5 \times DL + 2.5 \times RL + 2.5 \times WL$  equal to/less than FY

- 3. The minimum NFPA specification is exceeded in this paragraph by requiring safety margin above 2 to 1 while flowing water.
- 4. The stability factor or tip over safety margin is a minimum of 1.5 to 1.
- 5. An independent engineering firm verifies the aerial safety factor. Design verification includes computer modeling and analysis, and extensive strain gauge testing performed by an independent registered professional engineer. Verification includes written certification from the independent engineering firm made available by the manufacturer upon request from the purchaser.



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 All welding of aerial components, including the aerial sections, turntable, torque box and outriggers are performed by welders who are certified to American Welding Society.

7.	The weldment assemblies of each
	production unit are tested visually and
	mechanically by an ASNT certified
	level II non-destructive test technician.
	Testing procedures conform to the
	American Welding Society Standard
	B1.10 Guide for non-destructive
	testing. Test methods may also include
	dye penetrate, ultrasound and
	magnetic particle where applicable.

#### Aerial Ladder

- 1. Each ladder section consists of two (2) extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals and two (2) full-length handrails. The rungs on all sections are K-braced for maximum lateral stability. This K-bracing extends to the center of each rung to minimize ladder side deflection.
- 1. The ladder rungs are designed to eliminate the need to replace rubberrung covers. The rungs are spaced on 14 inch centers and have integral skidresistant surface. The minimum design load is 500 pounds distributed over a 3 1/2 " wide area.
- 2. The ladder has the following dimensions:

Section	Width	Height
Base Section	41 ½"	32"
Second Section	34 ¼"	28 1/8"

Third Section	28"	24 ¾"
Fly Section	22 ¾"	21 15/16"

#### Ladder Tip Step:

Two split design folding steps are located near the ladder tip to provide a position for a firefighter using the ladder pipe/monitor. The steps have a raised surface for traction and cut outs for deployment.

#### Aerial Extension Mechanism

1. Extension is by way of two (2) extension cylinders mounted on the side of the base aerial section.

#### Cylinder size

Bore	3 1/4"
Stroke	59 1/2"

2. The cylinder operates through a block and tackle cable arrangement to extend and retract the aerial. Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders. The normal operating cable safety factor is 5:1 and the stall safety factor is 2:1 based on the breaking strength of the cables. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used is 1 to 12.

#### Ladder Cable Size

1 <sup>st</sup> section (4, 2 extend and 2 retract)	34" 6 x 19 galvanized cable
2 <sup>nd</sup> section (4, 2 extend and 2 retract)	½" 7 x 19 galvanized cable
3 <sup>rd</sup> section (4, 2 extend and 2 retract)	3/8" 7 x 19 galvanized cable



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3. The aerial assembly consists of four (4) separate weldments that extend and retract within each other. Nylatron slide pads are utilized between each section to minimize friction. Four (4) C type interlocking load transfer stations enclose the slide pads. The transfer stations are located at the upper portion of the base and second ladder sections.

Time to retract ladder	maximum seconds	50
Time to raise ladder	maximum seconds	50
Time to lower ladder	maximum seconds	50
Time to rotate 180 degrees	maximum seconds	80

#### Aerial Extension Indicator

Red reflective tape stripes are installed on the ladder top handrail of the base section to indicate extension in 5-foot increments. Numeric indicators are placed at 10-foot intervals. A red reflective dot on the base of the 2<sup>nd</sup> section provides a visual reference for the operator to estimate aerial elevation.

#### Aerial Finish

To reduce maintenance expense the aerial has a natural aluminum swirled finish. Visible inspection of all ladder weld joints is permissible without having to remove paint or body filler to reveal the weld bead.

#### **Operation Times**

The aerial completes the time test in 90 seconds. This test involves raising the aerial from the bedded position to full elevation and extension and rotating to 90 This test begins with degrees. stabilizers deployed.

Time ladder	to	extend	maximum seconds	50
Accessor and comme		The second of the second and add	to the second of	التستسنينات بنيسينات تتت

### Aerial Ladder Rated Capacity

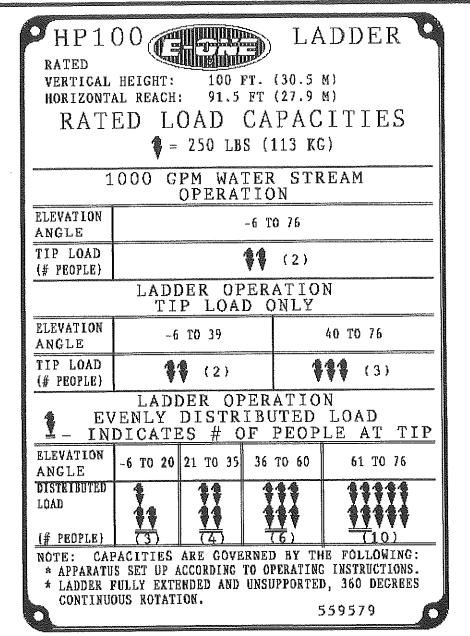
The aerial device has a rated capacity of 550 lbs. The rated capacity includes 500 lbs. in personnel allowance and 50 lbs. for equipment mounted at the tip of the ladder A sign mounted at the operators position of the aerial communicates the following ratings in the unsupported fully extended configuration while maintaining a 2.5 to 1 safety margin as defined in NFPA 1901. The loads in each configuration are in addition to 50 lbs. of equipment mounted at the tip.

#### Safe Load and Reach Charts

A lighted elevation/safe load indicator diagram is located on the operators control panel to indicate safe load capacity at any angle of elevation. The safeload chart clearly communicates aerial capacity in any one of the following conditions: tipload, tipload with water flowing, and distributed load at full extension. The chart usina graphic identifies capacity 250lb. each characters to indicate increment. The chart is equipped with and warns of electrocution lighting hazards from power lines and lightning.

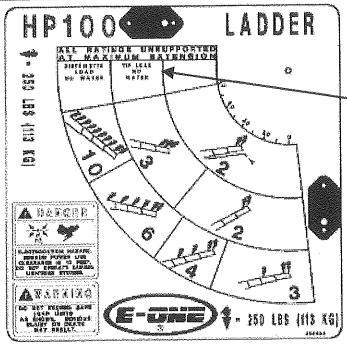


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NOTE: FLOW RATES WILL VARY WITH PUMP MODEL AND TYPES. THEREFORE, READ AND FOLLOW THE SAFE LOAD AND REACH CHART MOUNTED ON YOUR VEHICLE.

### Aerial Waterway System

1. A 1000 GPM pre-piped waterway is supplied. The waterway telescopes to the end of the fly section. A 4" waterway supply inlet at the base of the torque box runs through the turntable and a swivel joint to connect to the tubular waterway. The tubular waterway runs under the aerial. The waterway tubes have the following sizes:

Base Section	5" OD
Mid Section	4.5" OD
Third Section	4.0" OD
Flv Section	3.5" OD

 The tubes are constructed of hard coat anodized aluminum and are telescopic with the aerial ladder through sealed slip joints. The slip joints are fitted with zerk grease fittings to facilitate lubrication.  The water system is capable of flowing 1000 gpm at 100 psi nozzle pressure at full elevation and extension. The friction loss between the tip and below the swivel does not exceed 100 psi while flowing 1000.

### Pinned Waterway (Optional)

- 1. A remote controlled monitor/nozzle assembly is attached to a ladder fly section through channel slide pads monitor/nozzle allows the which assembly to be positioned at the tip of a section for maximum master stream reach or at the tip of the next section unobstructed rescue for down The monitor/nozzle capabilities. assembly is pinned at either operating location with a single stainless steel "T" handle locking ball pin. A monitor control station is attached to the sliding monitor/nozzle assembly and moves with it.
- The turntable monitor controls is connected to the sliding monitor system using an electronic multiplexing system that sends all monitor control



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signals over a shielded pair of wires through a spring retract electric cable reel. The collector rings in the cable reel are specifically designed for accurate transmission of electronic signals.

- 3. A gel-cell rechargeable battery is located on the sliding monitor assembly. A dedicated ground wire and 12VDC positive charging wire are routed from the turntable control station through the electric cable reel to the monitor battery. The charging wire is directly connected to the chassis 12VDC battery system through a 20 amp auto reset circuit breaker.
- The moveable monitor/nozzle assembly is capable of flowing from 300 GPM to 1000 GPM while maintaining a constant 80-100 PSI nozzle pressure for maximum stream projection.

### Waterway Monitor

- 1. An electric waterway monitor is equipped at the tip of the aerial and controlled from the operator's turntable position and the tip of the fly section. The water monitor is capable of flowing 1000 gpm at 100 psi nozzle pressure at full elevation and extension. The friction loss between the tip and below the swivel does not exceed 100 psi while flowing 1000 gpm. The monitor and nozzle is either an Akron or Elkhart model nozzles.
- The nozzle range of the electric monitor is 135 degrees through the vertical plane and 90 degrees to either side of ladder centerline in the horizontal plane. This water flow capability is available at any extension, elevation or position without any

restrictions while flowing 1000 gallons per minute.

#### Waterway Relief Valve

The waterway relief valve is located near the right outrigger assembly and automatically prevents overpressurization from an external water supply. The valve will dump if pressure exceeds 240 psi at a flow of 500 gpm.

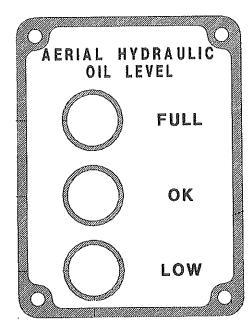
### Hydraulic System

- The hydraulic plumbing consists of stainless steel hydraulic tubing wherever possible to eliminate hose wear and provide a stronger medium to carry the hydraulic fluid. All hydraulic tubing is constructed of stainless steel and have a 4 to 1 safety rating based on burst pressure.
- 2. An interlock is provided that prevents activation of the hydraulic pump until the transmission is placed in neutral and the parking brake set.
- 3. The hydraulic system is of the latest design and incorporate features to minimize heat build up and provide smooth control of the aerial ladder. The system requires adequate cooling under 2 ½ hours of operations.
- 4. All hydraulic components that are non sealing whose failure could result in the movement of the aerial complies with NFPA 1901 18-19.1 and have a burst strength of 4 to 1. Dynamic sealing components whose failure could cause aerial movement have a margin of 2 to 1 on maximum operating pressure. All hydraulic hoses, tubes and connections have a minimum burst strength of 3 to 1 per NFPA 1901 18-19.2.



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5. A hydraulic oil pressure gauge is supplied on the vehicle. In addition, an aerial hourmeter is supplied at the operator's console. A hydraulic oil level gauge is supplied for easy fluid level verification. The three light system indicates full with a green light, ok with yellow light and, low oil level with a red light.



6. Hydraulic power for all operations are supplied by a chassis mounted positive displacement pump for consistent pressure and rapid response. The positive displacement vane pump is able to supply 13 gallons per minute at a maximum pressure of 3000 psi. The system operates between 1000 and 2500 psi with flow controls to protect hydraulic components and incorporate a relief valve set at 2800 psi to prevent over pressurization.

- 7. The hydraulic system consists of a 45-gallon reservoir mounted to the torque box and plumbed to the hydraulic pump. The tank is supplied with a removable top to access tank strainer filter. There is plumbing for a supply and return line and a tank drain on the reservoir. Gated valves under the tank allow for filter changes.
- 8. The hydraulic system uses 5w-20 multi-weight, SAE 32 grade oil and incorporate the following filters to provide dependable service:

reservoir breather

10 micron

magnetic reservoir suction 125 mesh strainer

pressure filter (torque box)

3 micron

return filter

10 micron

- 9. The aerial hydraulic system is designed in such a manner that a hydraulic pump failure or line rupture will not allow the aerial or outriggers to lose position. Hydraulic holding valves are mounted directly on cylinders. To insure reliable performance of holding valves, no hoses are permitted between a holding valve and cylinder.
- 10. The aerial incorporates the use of stainless steel tubes inside the torque box and jack legs to minimize the possibility of hydraulic leaks. The stainless steel tubes are installed inside the torque box to prevent damage from the elements.
- 11. Hydraulic power to the ladder is transferred from the torque box by a hydraulic swivel.



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### Open Flow System

- With the engine at governed RPM, the hydraulic pump supplies fluid to the inlet ports of the various system control valves.
- 2. The hydraulic fluid circulates through the control valves, filters, etc., and returns to the supply reservoir if the operating controls remain in neutral. Pressure in the non-functioning condition is very slight since minimal resistance is encountered.
- When the operator actuates a control lever, pressure in the applicable line of the selected system increases simultaneously, relative to resistance, resulting in the functional performance of the selected system.

### Emergency Pump

The hydraulic system is designed with an auxiliary power unit. The auxiliary power unit is a 12-volt pump connected to the chassis electrical system. The motors use the vehicle batteries as their power source. The pump provides operation at reduced speeds to store the aerial device and stabilizers for road transportation. Self-centering switches are provided at the turntable and each stabilizer control station to activate the system. The system is designed to provide a minimum of 5 minutes of hydraulic power to operate functions.

## A CAUTION

**HYDRAULIC** AUXILIARY THE PUMP/MOTOR IS NOT DESIGNED OR INTENDED FOR CONTINUOUS USE. **OPERATION SHOULD BE LIMITED TO** THE NECESSARY TIME TO RETURN **ASSEMBLY** AND THE AERIAL **STOWED OUTRIGGERS** TO THE POSITION.

#### Aerial Torque Box

 The aerial utilizes an integral torque box design. The torque box design carries the chassis, body, and aerial device as an integrated system. The system design provides a lower center of gravity to enhance road performance, a mounting point for under slung stabilizers, and additional space for body compartments.

#### Stabilization

- 1. The system consists of two (2) hydraulically operated out and down style stabilizers used to stabilize the vehicle during operation of the ladder assembly. The outriggers are mounted under the front tiller frame and are designed to minimize loss of compartment space. Maximum spread for the outriggers is approximately 18'.
- 2. Additionally, vehicle stabilization is accomplished by way of the rear suspension. The rear suspension "drops and locks" when the aerial master switch is engaged, stiffening the rear of the tiller during aerial operations. Four suspension bags located at the tiller axle inflate when the PTO master switch is engaged and the central bag lift is deflated.



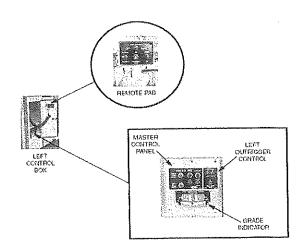
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- 3. In areas where the outriggers cannot be fully extended, the tiller can be Shortiacking shortjacked. accomplished when the outriggers are deployed in such a manner where one outrigger is deployed without extending and the other is fully deployed normally. Once outriggers are set, a rotation interlock system prevents the ladder from being fully rotated to the shortjacked side. Ladder rotation is limited to 180 degrees on the fully extended side and 5 degrees on the shortjacked side. The interlock system will not activate until at least one outrigger is fully extended and set on the ground. This procedure can be found in TILLER OPERATIONS.
- 4. The cylinders are equipped with dual pilot operated check valves on each stabilizer cylinder to hold the cylinder in the stowed or working position should a charged line be severed at any point in the hydraulic system. Stabilizers contain safety lock valves and require no mechanical pins to assure there will be no "leak down" of stabilizer legs.
- 5. Each stabilizer leg have attached to the end of the leg a 1/8" thick bright aluminum diamond plate shield, full height and width of the stabilizer opening. This plate serves as a protective guard and a mounting surface for warning lights. The top, forward, and rear edges have a flanged back for added strength.
- 6. Each stabilizer that can be extended from the body is equipped with a red warning light. The stabilizers are connected to a warning light in the cab to warn the operator if the stabilizers are deployed. A work light is provided in the stabilizer body opening to illuminate the stabilizer and the ground.

- The light will automatically come on with the deployment of a stabilizer.
- 7. The ground contact area for each stabilizer is a 10" x 14" without auxiliary pads and 24" x 24" with stabilizer pads deployed. The ground pressure will not exceed 75 psi when the apparatus is fully loaded and the aerial device is carrying its rated capacity in every position. This is accomplished with the stabilizer pads deployed.

#### Stabilizer Controls:

1. Two (2) electric solenoid valves control the stabilizers. Additionally, a remote control pad can also be used. Control switches are located at control boxes near the outriggers. The control panel and remote pad are located in the left control box. An audible alarm with a minimum 87 dba will also sound while the stabilizers are in motion. Stabilizer deployment is completed in less than 60 seconds.





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There is an interlock that prevents the operation of the ladder until the stabilizers are down and properly set. The interlock system is designed to prevent aerial movement until the stabilizers are set. Additionally, the system will not permit stabilizer movement when the aerial is out of the cradle. Two (2) micro switches, one (1) on each stabilizer leg, senses when both outriggers are in firm contact with the ground. This condition is indicated when the vellow indicator lights are on and the green interlock light is on. When the apparatus has been leveled, a manual transfer switch is used to shift hydraulic power to ladder operations.

- 2. The interlock system has a manual override with access through a door at the rear of the truck.
- To simplify leveling the apparatus, two color-coded level indicators are located at the rear of the vehicle. One indicator is for front to rear level and the other for side to side level.

### Turntable Assembly

- 1. The upper turntable assembly is mounted at the rear of the vehicle for proper weight distribution.
- 2. A 44" diameter turntable bearing with a 3" 3/4 drive gear face is bolted to the top of the bearing mounting plate with 1" diameter grade 8 plated bolts. Gear teeth are of stub tooth form. The rated overturning moment of the turntable bearing is a minimum of 238,000 ft lbs.
- 3. The operator's turntable platform is constructed of 3/8" plate steel at 96" in diameter. The plate is covered with a non-skid material for added safety.
- 4. Three safety railings of stainless steel are provided. One along the outside of the working platform, behind the

- operator's control console, and one each on the left and right hand sides.
- 5. The working platform is attached to the turntable support assembly on a 44 ¾" sheer ball turntable bearing, continuous 360 degree rotation in either direction provided by a high torque hydraulic motor. A rotation metering valve is provided to allow for finite metering of rotation speeds.

#### Elevation Mechanism

- 1. Dual 6" diameter elevating cylinders are mounted to the upper turntable assembly and the base section of the ladder by 2 1/4" spherical bearings.
- 2. The elevation hydraulic cylinders incorporate cushions on the upper limit of travel. The hydraulic elevation cylinders also serve as a locking device to hold the aerial in the stored position for road travel.

#### Rotation Mechanism

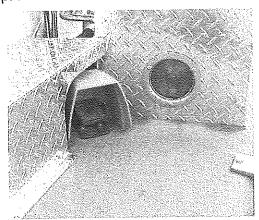
- 1. The hydraulic rotation motor provides continuous rotation under all rated conditions and is supplied with a brake to prevent unintentional rotation.
- 2. Rotation is accomplished by a high torque hydraulic motor driven through a spring applied hydraulically released multiple disk brake into a dual reduction planetary gearbox. The gearbox has a minimum intermittent rating of 120,000 lbs. The turntable bearing, ring gear teeth, spur gear, planetary gearbox and output shaft have a minimum safety factor of 2.5 to 1.



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#### Aerial Control Console

The operator's position is located on the right side of the aerial turntable. The apparatus is supplied with labels to warn of electrocution hazard. The control console provides a service access panel on the front to access hydraulic and electrical connections. The electrical panel is located in a junction box with labeled wires. The console is angled with an etched panel for long service life. The console is labeled and supplied with lights for night operation. A deadman's foot pedal is provided as extra safety. The aerial will not operate unless the pedal is depressed.



### Aerial Intercom System

A two-way intercom system is installed to provide communications between the operator's position and tip of the aerial. The speaker/microphone at the tip is hands free operation. The system consists of a 12 volt transistorized amplifier and two (2) waterproof send and receive speakers.

#### Console Cover

A diamond plate contoured hinged cover is supplied to protect the console from the elements. The cover latches in the stored position and swings away from the

console so as to not interfere with the sight of the aerial device.

### Rung Alignment Indicator

A light on control console indicates when the ladder rungs are aligned for climbing.

#### Electrical System

Electrical power is transmitted from the chassis to the turntable through electrical slip rings located under the turntable. These slip rings are an integral part of the oil swivel housing, and are totally enclosed to prevent dirt from contaminating the rings.

This vehicle is wired for 110 VAC service. All wiring from the breaker box to the various appliances, is protected by a ground fault circuit breaker located in the breaker box.

#### CAUTION

INSPECT THE ELECTRICAL CABLES FREQUENTLY TO ENSURE THEY HAVE NOT BECOME CUT OR FRAYED, CAUSING AN ELECTRICAL SHORT.

### Breathing Air (optional)

The aerial may be equipped with an optional breathing air system. The air system holds a total of 300 cubic feet of air carried in a single (or double) DOT 300 cubic foot cylinder rated at 2216 psi. The air tank is painted yellow and marked with a label that reads "High Pressure 2216 PSI Breathing Air". A guard is on the cylinder end to protect the valve.

All components of the piping system has a 3 to 1 safety margin. There is a high pressure regulator supplied at the base of the aerial to reduce the air pressure to no



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more than 125 PSI up the aerial. All valves and fittings and hoses are constructed of corrosion resistant material. A pressure relief valve set at 1 1/2 times the working pressure is supplied to relieve the air lines in the event of a pressure regulator failure. An air mask box is provided to store breathing air masks at the tip of the aerial.

A low breathing air alarm is provided. The low air warning system provides an audible and visual warning at the base operator's control station when the volume of air is at or below 20 percent.



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#### INTRODUCTION

1. The simplicity of a well designed hydraulic system and aerial assembly allows for an individual with average ability and proper training to become proficient in operating the aerial ladder. The safe and efficient execution of the aerial assembly functions during operations will depend, in part, on the operator's capacity not to extend the limitations and safety factors of the aerial assembly design.

## **A** WARNING

THE AERIAL ASSEMBLY IS NOT INSULATED. KEEP THE AERIAL AT LEAST TEN FEET FROM OVERHEAD POWER LINES. WHEN ELEVATING THE ASSEMBLY NEAR LINES. PERSONNEL ON THE GROUND SHOULD STAND CLEAR OF THE VEHICLE, AND AVOID STEPPING ONTO OR TOUCHING THE VEHICLE UNTIL THE ASSEMBLY IS IN A SAFE POSITION WITH RESPECT TO THE OVERHEAD POWER LINES. PERSONNEL TOUCHING THE GROUND AND THE VEHICLE, WITH THE ASSEMBLY CONTACTING AN **ENERGIZED POWER LINE, WILL BECOME A PATHWAY TO GROUND** FOR ELECTRICAL CURRENT. **RESULTING IN SEVERE PERSONAL** INJURY OR DEATH.

- Only trained operators should be allowed to operate the aerial assembly, observing the following rules to ensure safety and operational efficiency:
- Complete a comprehensive study of the manual and have a thorough knowledge of operating instructions,

safety precautions, unit capabilities, and limitations.

- Learn to operate the controls without looking at the control panel. Learn the location of each control, its function, and how it operates.
- Operate the controls smoothly to prevent jerking and erratic aerial movement. Whipping and bouncing are the most likely cause of damage to the aerial and rotation gear assembly.
- Practice basic no load operations at a low engine RPM setting, under capable supervision during initial training.
   Practice full load operations in simulated "on the scene" conditions.
- Do not leave the operator's control station with the aerial assembly raised, or in an operational capability.
- Do not lower the aerial on buildings, trees, telephone poles, lights, or the truck body.
- Give undivided attention to the aerial assembly during operations, if distracted, stop operations.
- Personnel must wear a personal safety harness while the aerial is in operation.
- The operator should keep their eyes on the assembly to avoid overhead electrical wires or any object which could be struck.



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 Ensure the ladder is fully retracted and monitor is fully stowed at a 90 degrees before lifting off the cradle to prevent damage to tiller cab.

## **A** WARNING

IT IS RECOMMENDED THAT A
SPOTTER BE USED IN STOWING THE
AERIAL DEVICE INTO THE CRADLE.
FAILURE TO DO SO COULD RESULT IN
PROPERTY DAMAGE.

## A CAUTION

THE OPERATOR SHOULD NEVER
LEAVE THE OPERATOR'S CONTROL
STATION DURING ON SCENE
OPERATIONS. IF PERSONNEL ON THE
AERIAL BECOME OVERCOME BY
SMOKE OR OTHERWISE
INCAPACITATED, THE OPERATOR
CAN MOVE THE AERIAL TO A SAFE
LOCATION.

- Perform inspection of the aerial assembly and outriggers daily.
   Perform weekly operational tests to ensure unit readiness.
- Note and report any signs of trouble before or during operation, paying particular attention to the following:
- Drifting hydraulic cylinders.
- Excessive oil pressure, oil leaks, and excessive oil consumption.

- Unusual noise or vibrations in the hydraulic pump.
- Erratic movement of the aerial, turntable, outrigger jacks, or function controls.
- Metal particles, sand, or other contamination on the aerial extension slide surfaces, outrigger jack legs, or cylinder rod surfaces.
- Unlubricated aerial extension slide pads, or outrigger jack leg slide surfaces, pulleys, and retainers.

#### SITE LOCATION

- The vehicle should be positioned at a suitable location where the ground is stable and the vehicle will be as level as possible. Maximum outrigger jack loads are generated during operation of the ladder assembly at full extension and low elevation to the side of the vehicle.
- Use good judgement in a potentially precarious situation to not jeopardize vehicle stability. Take into consideration the following conditions:
- Overhead power lines within TEN FEET of the aerial extension or other obstructions. The aerial ladder is not insulated and becomes a direct line for electrical flow.
- Reach capability of the aerial assembly to required area. Refer to the safeload and reach charts outlined later in this section.
- Hot and /or soft asphalt where outriggers may sink and cause the vehicle to become unstable.



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- Soft earth or ground erosion caused by hydrant or supply hose run-off water or rain.
- Frozen ground thaw caused by vehicle created heat.
- Retaining wall heights, open construction areas, underground parking ramps, or garages.
- Underground drain or sewer pipes.



OUTRIGGER PADS SHOULD NOT BRIDGE CURBS, DITCHES, GULLIES, OR RUN-OFF DRAINS, OR BE PLACED OVER MANHOLE COVERS.

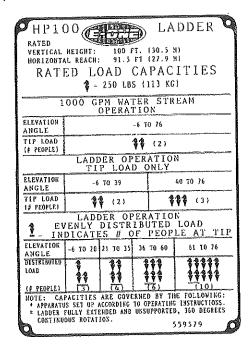
 Under any conditions, use wheel chocks under the front wheels.

# LOAD CAPACITY AND TIP LOAD CHARTS

The Load Capacity Chart and Tip Load charts are mounted at the control console and the base of the aerial assembly on the left side. To ensure safe operations, the following general guidelines must be adhered to:

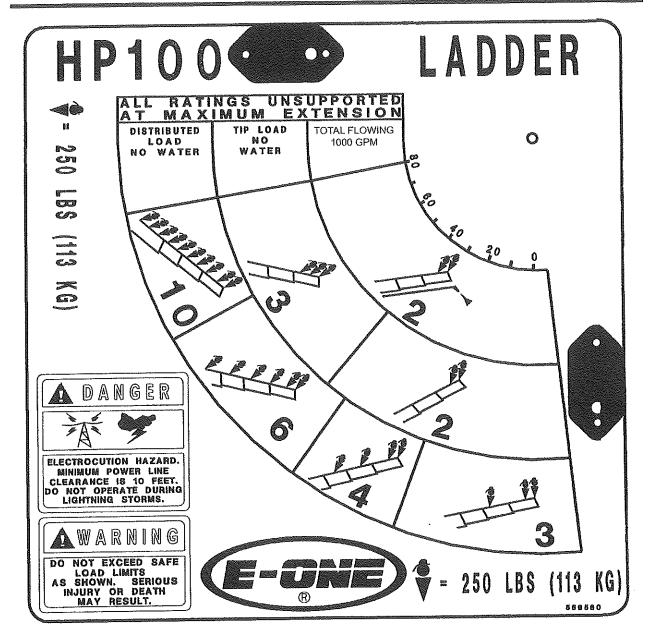
Learn the load capacities of the aerial device.

- Do not rely on memory. Refer to the charts before operating the aerial.
- Never exceed the published load limits.
- Distribute the weight on the aerial device evenly. Ten feet between personnel recommended.





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#### PTO OPERATION

 The power required to drive the main hydraulic pump is supplied by the vehicle engine accessory drive. The aerial PTO switch is located on the driver's control panel in the vehicle cab.

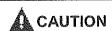
**NOTE:** On this vehicle the hydraulic system is supplied by the power steering pump. In this case, the PTO switch selects between the power steering or aerial operations through a diverter valve.

 Outrigger and aerial assembly operations can begin after the aerial PTO is engaged. Engage the aerial PTO in accordance with the following instructions.

**NOTE:** On vehicles equipped with an electro-hydraulic PTO, the PTO must be engaged below 1000 RPM.

**NOTE:** PTO engagement can only be achieved with the transmission in neutral, and the parking brake is set.

3. Set the parking brake.



ALWAYS DISENGAGE THE PTO AFTER USE. THE HYDRAULIC PUMP, PTO OR TRANSMISSION MAY BE DAMAGED IF THE VEHICLE IS DRIVEN WITH THE PTO ENGAGED.

- 4. With the engine at idle speed, place the transmission in neutral (N).
- Activate the aerial PTO rocker switch. The AERIAL ENGAGE indicator lamp on the main dash warning panel will illuminate.

#### OPEN FLOW SYSTEM

With the engine at governed RPM, the hydraulic pump supplies fluid to the inlet ports of the various system control valves. The hydraulic fluid circulates through the control valves, filter, etc., and returns to the supply reservoir if the operating controls remain in neutral. Pressure in the non-functioning condition is very slight since minimal resistance is encountered. When an operator actuates a control lever, pressure in the applicable line of the selected system increases simultaneously, relative to resistance, resulting in the functional performance of the selected system.

#### **OUTRIGGER OPERATION**

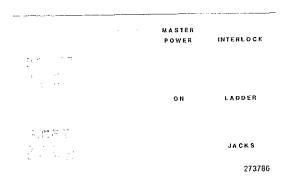
- 1. The purpose of the outrigger is to provide an expanded level, rigid base for aerial operations.
- 2. Field circumstances can prevent less than ideal conditions for maximum stability provided by the outriggers.
- Keep in mind that the more out of level the vehicle is, the more ladder stability is reduced.
- 4. Extend the outrigger jacks in accordance with the following instructions:
- 5. Position the vehicle at the selected site.
- 6. Shift the transmission to NEUTRAL.
- 7. Set the parking brake, and wedge block the front wheels.
- 8. With the engine at idle, engage the aerial PTO switch located on the cab dash.

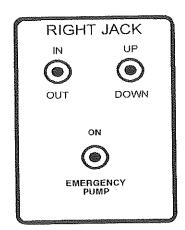


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**NOTE:** Both outriggers can be operated from a remote control pad located in the left control box compartment next to the left outrigger, or individually by the left and right control boxes next to each outrigger.

- On the MASTER JACK CONTROL PANEL located in the left control box, position the MASTER POWER switch to ON. The MASTER POWER indicator lamp will illuminate.
- Position the LADDER/JACKS transfer switch to JACKS.







REMOTE PAD



DO NOT CONTINUE TO LOWER
OUTRIGGER JACKS IF THEY TOUCH
THE GROUND BUT ARE NOT AT FULL
EXTENSION. DAMAGE TO THE
EXTENSION CYLINDERS COULD
RESULT.



STAND CLEAR OF JACK EXTENSIONS WHILE OPERATING. SERIOUS INJURY OR DEATH MAY RESULT.

11. Using the independent jack control on either side first (or from the remote pad), extend the outrigger out to the end of the cylinders stroke.

#### CAUTION

WHEN OPERATING IN FREEZING CONDITIONS, SAND OR SALT SHOULD BE USED UNDER THE JACK PADS TO KEEP THE VEHICLE FROM SLIDING.

12. Spot the auxiliary jack pads, Then continue lowering the jacks, raising the vehicle until the tires are just clear of the ground.

**NOTE:** The auxiliary jack pads are located on the underside of the vehicle body, adjacent to each outrigger. The pads are



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intended to be used whenever the outriggers are operated.

**NOTE:** It is necessary to raise the tractor drive tires off the ground for the most stable aerial operations.

13. Using the opposite JACK control, extend the opposite side outriggers in the same manner, raising the vehicle until the tires are just clear of the ground.

**NOTE:** Do not lower the outrigger jacks to the limit of the lift function. If the ground is not perfectly level, the operator will be unable to set the jacks securely on the ground, and the vehicle will not level.

14. Level the vehicle using the jack controls. The green INTERLOCK indicator lamp will light when both right and left jacks down lights are illuminated.

**NOTE:** Recheck blocks after the vehicle has been raised. Ensure the blocks are repositioned from all wheels before lowering the vehicle and stowing outriggers.

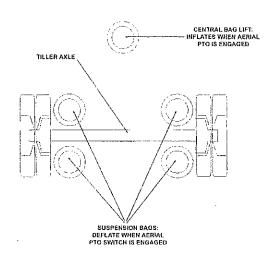
- 15. Visually check outriggers for stable positioning.
- 16. Position LADDER/JACKS transfer switch to LADDER.

#### TILLER AXLE STABILIZATION

- 1. To stabilize the tiller axle before aerial operations, follow the steps below:
- 2. Bring the vehicle to a complete stop.
- 3. Set the parking brake and place the truck in neutral.
- 4. On the left overhead console, place the AERIAL PTO switch to ON. Place

the aerial master switch located in the left outrigger compartment to ON. The four air bags located on the tiller axle should deflate and the central bag should inflate.

- 5. Perform outrigger operations.
- To restore the tiller to driving operations, turn off the AERIAL PTO switch and place the AERIAL MASTER to OFF. The suspension bags will inflate and the central bag will deflate.



#### SLOPED SURFACES

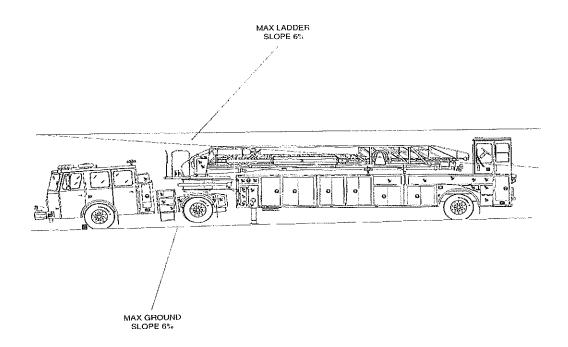
1. Setting the outriggers should not be attempted on slopes exceeding 6% grade (3.4 degrees, 6 foot rise per 100 feet) front to rear, or side to side. The vehicle should not exceed a 6% grade when outriggers are set. Observe the grade indicators located at the rear of the vehicle, and maintain between the green and yellow zones. The smoothest operation will be obtained when leveled within the green zone. If the vehicle is on a slight slope, extend the outriggers in accordance with the following instructions:



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2. On a front to rear grade, set the truck up with the nose downhill for maximum leveling capability.





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- Ensure the vehicle is ready for outrigger extension (See Outrigger Operations).
- 4. Extend the outrigger on the uphill (high) side first, until the jack is touching the ground.
- 5. Extend the outrigger on the downhill (low) side, raising the vehicle to a level position. The vehicle must be raised enough to sequence the interlock system and unload the tractor suspension.
- Using the opposite JACK control, extend the opposite side outriggers in the same manner, raising the vehicle slightly, taking the rear tires slightly off the ground.

#### CAUTION

PREFERRED AERIAL OPERATION IS
ON THE UPHILL SIDE. WHEN
CIRCUMSTANCES FORCE
OPERATIONS TO BE PERFORMED ON
THE DOWNHILL SIDE, A REDUCED
PAYLOAD AND SHORTENED RADIUS
WILL BE REQUIRED TO COMPENSATE
FOR THE INCREASED TILTING
FORCES, WHICH CREATE REDUCED
VEHICLE STABILITY. THIS IS ONLY
TRUE IF OPERATING ON GREATER
THAN 6% SLOPE.

#### SHORT JACKING



AT LEAST ONE OUTRIGGER MUST BE FULLY EXTENDED AND SET ON THE GROUND FOR THE INTERLOCK SYSTEM TO ALLOW AERIAL OPERATION.

**NOTE:** Outriggers can be extended or retracted only if the jack leg cylinders are fully in the up position.

- Short jacking can be accomplished two ways:
- Driver's side short jacking (left).
- Officer's side short jacking (right).
- 2. To begin short jacking operations, perform the following:
- 3. Switch the MASTER POWER CONTROL switch to MASTER. The MASTER POWER light will illuminate.
- 4. Switch LADDER/JACK switch to JACK.

### Short jacking on the Left Side

**NOTE:** The aerial will not operate if both outriggers are set up for short jacking at the same time.

- On the left jack control box, move the in/out switch to the out position. Extend the jack leg out to a position as far as possible (3" minimum).
- On the left jack control box, move the up/down switch to the down position, and lower jack normally.
- 3. The left jack light on the master control panel is now illuminated.



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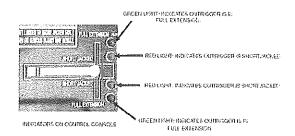
- 4. On the turntable console, the short jacking is indicated by the illuminated red light.
- On the right jack control box, move the in/out switch to out and to full extension.
- On the right jack control box, move the up/down switch to the down position.
- 7. The right jack down light on the master control panel is now illuminated.
- 8. On the turntable console, the green light is illuminated for full extension.

#### Short jacking on the Right Side

**NOTE:** The aerial will not operate if both outriggers are set up for short jacking at the same time.

- On the left jack control box, move the in/out switch to the out position until fully extended.
- 2. On the left jack control box, move the **up/down** switch to the **down** position.
- The left jack light on the master control panel is now illuminated.
- 4. On the turntable console, the full extension is recognized by the illuminated green light.
- On the right jack control box, move the in/out switch to out position. Extend the jack leg out to a position as far as possible (3" minimum).
- 6. On the right jack control box, move the **up/down** switch to the **down** position.
- 7. The right jack down light on the master control panel is now illuminated.

8. On the turntable console, the red light is illuminated for short jacking.



- The master control box interlock light should illuminate after the second jack engages the ground with AT LEAST one jack at full extension.
- 10. On the master jack control box, switch the LADDER/JACK switch to LADDER.
- 11. The red and green lights on side that is short jacked are now illuminated.
- 12. Fast idle switch (optional) to ON.
- 13. Ensure there is clearance to move aerial away from tiller cab. Lift aerial to height.
- 14. Rotation is limited to 5 degrees on the short jacked side to a full 180 degrees on the fully extended side.
- 15. At the 180 degrees position, the rotation interlock activates to prevent any further movement past 5 degrees on the short jacked side.

#### **UNEVEN TERRAIN**

 On uneven terrain, where outriggers cannot be extended enough to give proper lift, blocking with sufficient support size and strength may be placed under the outrigger pads.



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**NOTE:** The first choice when encountering uneven terrain is to relocate the vehicle. If on scene emergency conditions do not permit relocation, blocking may have to be used.

2. Caution should be exercised when using blocking. Place the blocking so it will not slip from under the jack pad.

**NOTE:** EMERGENCY ONE does not recommend that blocking be used, but does recognize that not all emergency situations will allow ideal operating conditions.

#### WINDY CONDITIONS

Aerial assembly operations are not recommended with wind speeds in excess of 35 MPH. Operations with full load and extension are capable of being performed by the ladder assembly within the 35 MPH wind speed limit.

### EXTREME HEAT CONDITIONS

1. If the aerial assembly is exposed to extreme heat during operation, thoroughly inspect the assembly, directing particular attention to the ladder extension slide pads, cables, waterway seals, pulleys, and hydraulic lines.



IF HARDNESS READING FALLS TO 70, CONTACT EMERGENCY ONE. IF HARDNESS READING FALLS TO 60 OR LOWER, REMOVE THE AERIAL FROM SERVICE AND CONTACT EMERGENCY ONE IMMEDIATELY.

2. The aerial should be inspected and tested in accordance with NFPA-1914

standard testing. Check the heat indicators located at the tip of each aerial section on the forward facing brace. If the heat indicator turns black, have the aerial tested using a Barber-Coleman Model GYZJ 934-1 portable hardness tester, check the aerial material for hardness. Normal hardness readings should fall between 78 to 82.



IP PERPERLITATE MARCHES CO FARME BLACK PARCHES CO MATERIAL SACKES BY PERFE CONTACT ROS. FOR BETALE

#### FREEZING CONDITIONS

 A substantial build-up of ice is very probable in freezing weather when operating a waterway system on the aerial assembly.



#### A DANGER

WHEN OPERATING IN FREEZING
CONDITIONS, SAND OR SALT SHOULD
BE USED UNDER THE JACK PADS TO
KEEP THE VEHICLE FROM SLIDING
WHEN THE AERIAL IS IN THE
EXTENDED POSITION. SERIOUS
DAMAGE TO EQUIPMENT AND INJURY
OR DEATH TO PERSONNEL ON THE
AERIAL DEVICE COULD OCCUR.

NOTE: Ice build-up and accumulation on the aerial will decrease load and extension capabilities. Use a steam cleaner or deicer to remove ice. Do not chip ice with an axe.

Aerial movement should be possible even with a build-up of ice. Ice build-



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up on the aerial may have to be tolerated until corrective action can be taken. Avoid ice accumulation on any controls.

**NOTE:** Hydraulic aerial movement will be comparatively slow when the fluid is cold. Normal speed will return as the fluid warms from circulation.

- When a vehicle has been exposed to below zero weather without operating for a prolonged period of time, allow the fluid to circulate at low throttle until the fluid becomes warm before operating the ladder or outrigger functions.
- Oil locked in the outrigger cylinders, or any cylinder locked for an extended period of time during operation, will quickly return to ambient temperature.
- Thoroughly inspect the aerial assembly after operating in ice and freezing conditions. Particular attention should be directed to the extension slide pads, cables, pulleys, and hydraulic lines.
- Ensure waterway has been drained as per procedures in WATERWAY DRAINING later in this section.

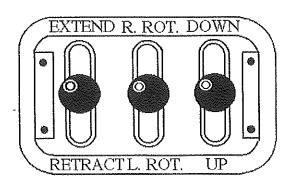
#### **OPERATOR CONTROL CONSOLE**

The operator control console is located on the right side of the ladder assembly and has three separate levers controlling the three aerial functions of raising-lowering, extension-retraction, and rotation. Lever movement for the desired function is outlined as follows.

#### CAUTION

ALWAYS OPERATE CONTROLS
SLOWLY AND SMOOTHLY TO AVOID
JERKY AND ERRATIC LADDER
MOVEMENT. DO NOT MAKE SUDDEN
CONTROL LEVER, ENGAGE, OR
DISENGAGE MOVEMENTS. SUDDEN
ERRATIC LADDER OR JERKING
MOTION COULD ENDANGER
PERSONNEL, AND CAUSE DAMAGE
TO THE LADDER ASSEMBLY.

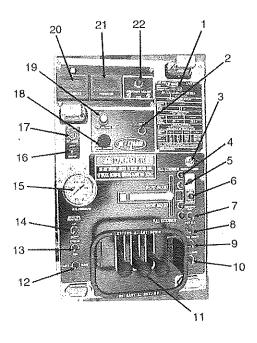
- Apply slow even pressure to control levers for smooth ladder function starts and stops. Hold each lever back or forward until desired ladder position is obtained.
- Increasing the operational speed of a given function is controlled by lever movement away from its neutral position.
- 3. Use finger and handrest (formed ring around control levers), for improved hand stability and metering control.





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#### OTHER FEATURES



- LOAD CAPACITY CHART
- 2. TALK SWITCH
- 3. RUNG ALIGNMENT INDICATOR
- 4. FULL EXTENSION INDICATOR
- 5. SHORT JACKING INDICATOR
- 6. CRADLE ALIGNMENT INDICATOR
- 7. FAST IDLE SWITCH
- 8. EMERGENCY PUMP SWITCH
- 9. LADDER LIGHT SWITCH
- 10. PANEL LIGHT SWITCH
- 11. AERIAL CONTROLS
- 12. MONITOR LEFT/RIGHT SWITCH
- 13. MONITOR STREAM/FOG SWITCH
- 14. MONITOR UP/DOWN SWITCH
- 15. HYDRAULIC PRESSURE GAUGE
- 16. MONITOR STOW LIGHT
- 17. WARNING LIGHT
- 18. BASE VOLUME KNOB
- 19. TIP VOLUME KNOB
- 20. FLOWMINDER GAUGE
- 21. PRESSURE INDICATOR
- 22. BREATHING AIR LOW LIGHT

### Load Capacity Chart (1)

- Understand the load capacities of this chart.
- Never exceed the published load limits.

### Talk Switch (2)

This switch allows the console operator to communicate with personnel on the aerial tip.

### Rung Aligned Indicator (3)

This light will illuminate when the ladder rungs are in alignment and safe for climbing.

### Full Extension Indicator (4)

This light will illuminate when the outrigger is at full extension.



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### Short jacking Indicator (5)

This light will illuminate when the outrigger is short jacked.

#### Cradle Alignment Indicator (6)

This light will illuminate when the ladder is rotated and in position to bed in the cradle.

#### Fast Idle Switch (7)

Activate this switch to increase/decrease engine RPM.

#### Emergency Pump Switch (8)

Activate this switch when the hydraulic system has failed. Use the pump only to retract the outriggers and bed the ladder (see Auxiliary Hydraulic Pump Operations later in this section).

#### Ladder Light Switch (9)

Activate this switch to illuminate the ladder spotlights.

#### Panel Light Switch (10)

Activate this switch to illuminate the panel console lights.

#### Aerial Controls (11)

These controls allow movement of the ladder assembly.

#### Monitor Left/Right Control (12)

This switch controls the left and right movement of the monitor at the tip of the aerial.

#### Monitor Stream/Fog Control (13)

This switch changes the water flow coming out of the monitor to either stream or fog patterns.

#### Monitor Up/Down Control (14)

This switch controls the up/down movement of the monitor.

#### Hydraulic Pressure Gauge (15)

This gauge displays the operating pressure when the ladder is active. Normal operating range is between 1000 and 3000 PSI.

#### Monitor Stow Light (16)

This light will illuminate when the monitor is stowed at a 90 degree angle.

### Warning Light (17)

This light will blink if monitor is not stowed at 90 degrees and the ladder is not fully retracted prior to setting ladder in cradle.

#### Base Volume Knob (18)

This knob controls the volume at the control console.

#### Tip Volume Knob (19)

This knob controls the volume at the tip speaker.

#### Flowminder Gauge (20)

This digital gauge monitors the flow in the waterway system.

#### Pressure Indicator (21)

This indicator displays the water pressure flowing through the waterway.

#### Breathing Air Low light (22)

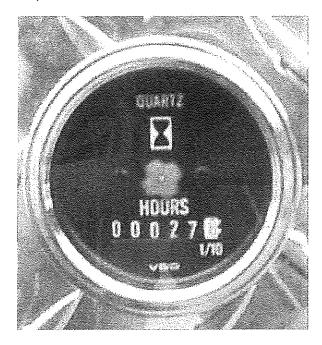
This light will illuminate when the breathing air pressure is at 20%. An audible alarm will sound with the light. See BREATHING AIR OPERATIONS later in this section.



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#### Hourmeter

An hourmeter, situated on the front of the console, displays the hours used on the aerial device. It will continue to run anytime the aerial master switch is on.



#### INTERLOCK SYSTEM OPERATION

 The electro/hydraulic interlock system is designed to allow boom and aerial assembly operation only after all outrigger jacks are positioned on stable ground. Normal retraction of the outriggers can be accomplished only when the ladder is firmly stowed.

**NOTE:** If the electro/hydraulic interlock system fails to operate, see Manual Interlock Override in this section.

 OPERATIONAL DESCRIPTION: The following is a sequential operational description of the hydraulic interlock system, beginning with the aerial in the stowed (travel) position. Viewing the electrical and hydraulic schematics while reading the operational descriptions, will aid in understanding the interlock system.

- 3. The stowed aerial closes the plunger switch located on the forward ladder support. This switch allows 12-volts to the JACKS side of the manual LADDER/JACKS transfer switch. Manually tripping the transfer switch to JACKS allows the 12-volts to activate the solenoid directional valve, directing fluid flow from the hydraulic pump through valve port 'P' and out valve port 'A' to the outrigger control valves. The directional valve is detented and will stay in position throughout either outrigger or aerial operations once it has been activated.
- 4. Switches on each jack leg are wired in series and will activate a relay, that in turn will turn on the jack down lights. After all the jacks down lights are on, the interlock light will come on automatically.
- 5. The instant 12-volts is at the aerial side of the transfer switch, the indicator lamp will light. The illuminated indicator will mean that 12-volts is available at the transfer switch to redirect the solenoid hydraulic directional valve for aerial operations. Manually tripping the transfer switch to LADDER will energize the solenoid for the directional valve and redirect fluid pressure thru port 'P' and out port 'B' to the aerial control valves.
- 6. Once the aerial is raised from the stowed position, the roller plunger switch opens, and electrical flow to the JACKS side of the transfer switch is stopped, making the switch nonfunctional for jack operational transfer. When the aerial is firmly stowed, the transfer switch will again become functional for transfer to jack operations.



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**NOTE:** When the aerial is in the raised position and the vehicle electrical power is shut off, the interlock lamp will go out. When vehicle power is restored, the jacks down and interlock lights come on and aerial power will resume.

7. Manually placing the transfer switch to JACKS will activate the solenoid directional valve and redirect hydraulic flow for outrigger operations. When the JACK controls are placed in the UP position, to begin retracting the outrigger jacks, 12 volts from the switch will activate the relay and shut off the interlock light, killing power to the aerial side of the transfer switch.

### MANUAL INTERLOCK OVERRIDE

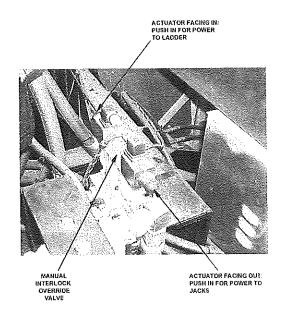
 In the event that the electro/hydraulic interlock system malfunctions, the directional solenoid valve can be manually overridden to re-direct hydraulic pressure flow for either aerial or outrigger operations. Access is through a small door at the rear of the vehicle.

**NOTE:** The LADDER/JACKS transfer switch must be positioned in the correct functional mode before the control valve will switch to the desired function.

- Outrigger jack power is redirected by pressing the manual actuator facing the operator, when the access door is opened.
- Aerial power is redirected by reaching behind the control valve and depressing the actuator.

## **A** WARNING

MANUAL INTERLOCK OVERRIDE SHOULD ONLY BE PERFORMED IN THE EVENT OF AN ELECTRICAL SYSTEM MALFUNCTION. DO NOT OPERATE THE AERIAL UNLESS THE OUTRIGGERS ARE EXTENDED TO A SAFE OPERATING CONDITION. FAILURE TO FOLLOW THESE DIRECTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.



# MANUAL OVERRIDE of the JACK CONTROL VALVE

- In the event of electrical failure, follow the procedures below:
- 2. Depress the manual override button on the unloader valve.
- 3. Depress the manual override button on the desired jack control.

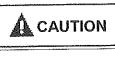
**NOTE:** LADDER/JACK selector switch must be in the jack mode.



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### AUXILIARY HYDRAULIC PUMP

 The boom and outriggers may be moved to the stowed position in case the main hydraulic pump malfunctions or the vehicle engine stalls.

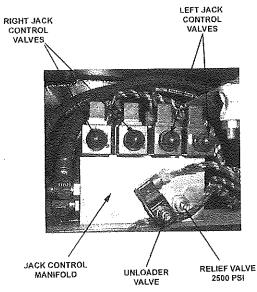


THE AUXILIARY PUMP MOTOR IS NOT DESIGNED OR INTENDED FOR CONTINUOUS USE. OPERATION SHOULD BE LIMITED TO THE NECESSARY TIME TO RETURN THE AERIAL ASSEMBLY AND OUTRIGGERS TO THE STOWED POSITION. DAMAGE TO PUMP WILL RESULT.

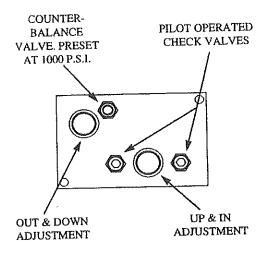
- The auxiliary hydraulic pump is driven by a 12-volt DC electric motor which uses the vehicle batteries as its power source.
- Use of the auxiliary pump will enable operation of all hydraulic functions, but not simultaneous operation. The operational speed of each function will be reduced due to a substantially lower GPM flow than the main hydraulic pump.

NOTE: One momentary contact switch to activate the auxiliary pump is located at the rear operator's control station for boom and outrigger assembly operation, and two switches located at the rear of the vehicle for outrigger operation. Optional switches may be located at the pump operator's station.

 Activate the auxiliary pump by holding the momentary contact switch to ON, while simultaneously operating the retract, rotate, or lower control levers. After operations have been completed,



PUSH IN ACTUATORS IN FRONT FOR OUT AND DOWN MODE REACH BEHIND MANIFOLD FOR UP AND IN MODE





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release the momentary contact switch to halt auxiliary pump operation.

5. To manually activate the auxiliary pump for outrigger operations, hold the momentary contact switch, located on the rear panel, in the ON position. Operate the right and left JACK levers to raise and stow outriggers. Release the momentary contact switch to halt auxiliary pump operation.

**NOTE:** If outrigger jacks fail to complete full cycle of retraction, the dual sequencing valves may be set too high to allow operation at the reduced GPM and PSI output of the auxiliary pump.

Refer to OUTRIGGER
 PROGRESSIVE OPERATION in the Service and Maintenance manual.

#### **EMERGENCY OPERATIONS**

 If a failure or rupture in the hydraulic system occurs, operations should be halted immediately.



HIGH PRESSURIZED HYDRAULIC
FLUID IS PRESENT DURING A
RUPTURE IN THE SYSTEM.
PERSONNEL SHOULD STAY CLEAR
OF ANY RUPTURED COMPONENTS
UNTIL EMERGENCY SHUT-DOWN
PROCEDURES HAVE BEEN
COMPLETED. FAILURE TO DO SO
WILL RESULT IN INJURY OR DEATH.

 Depending on the failure or rupture location, it may be necessary to shut down the hydraulic pump by disengaging the PTO, or stopping the vehicle engine. Not operating a particular control in-line with a rupture may be sufficient action to stop fluid from being ejected.

#### **RUNG ALIGNMENT**

When extending or retracting the ladder, observe the rung alignment indicator light located on the turntable control console. The lamp will illuminate when the overlapping sectional rungs are properly aligned for climbing.

#### INTERCOM OPERATION

- 2 WAY INTERCOM. An intercom is located at the rear operator control station and boom tip. OFF/ON, VOLUME and TALK switches for intercom operation are located at the control station.
- Personnel at the aerial tip are not required to operate controls to talk or listen. The speaker at this station is a talk/listen type module. A volume knob is located at the control station, controlling speaker volume only, not the talk function.
- 3. The control station operator will be required to depress and hold the talk momentary contact switch while talking. During initial start up, turn the OFF/ON switch to ON. Gradually turn the VOLUME knob and vocally test the system for a suitable volume level at each intercom control station.

#### **OPERATING INSTRUCTION OUTLINE**

 The safe and efficient operation of the aerial functions during operation will depend on the ability of the operator not to exceed the capabilities and safety factors of the aerial design. Read and observe all instructions and safety precautions as an aid to proper operation.



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- 2. Make a visual inspection of the aerial, waterway system, cables, hydraulic lines, etc., before operation. Do not operate the vehicle until all repairs have been made.
- 3. Choose a suitable location on stable ground, and position the vehicle as level as possible, being aware of power lines and buildings.
- Set the parking brake, set the transmission to neutral, wedge-block the front wheels, and engage the PTO. Position MASTER POWER switch located on the master jack control panel to ON.
- Extend the outriggers, position the auxiliary jack pads, and lift the tires slightly off the ground to a level position. Observe the INTERLOCK indicator lamp.
- Position LADDER/JACKS transfer switch to LADDER. Observe the Safe Load and Reach Chart located on the operator control station panel.
- Raise the aerial enough to clear cab and equipment before extending or rotating. Operate the aerial at engine idle R.P.M when maneuvering the aerial near buildings or confined spaces.
- 8. The fast idle switch may be activated to raise engine RPM for multiple controls in non-restricted areas.
- Raise, extend, and rotate the aerial assembly.
- 10. Return the aerial to the stowed position, operating the engine at idle RPM. Bed the aerial down in the cradle. Observe hydraulic pressure of

between 1000-1200 PSI at idle speed only.

- 11. Place the LADDER/JACKS transfer switch from LADDER to JACKS position.
- 12. Completely retract the outriggers.
  Place the MASTER POWER switch to
  OFF. Disengage the PTO.

### WATERWAY DRAINING

- Always drain the waterway system after use (particularly in extremely cold weather).
- With the rear drain valve completely open, raise the aerial to its maximum elevation to allow water to completely drain from the waterway.

**NOTE:** Full extension is required to complete waterway draining.

#### FLUSHING LOWER WATERWAY

- On vehicles equipped with a prepiped waterway and a water pump, remove the rear inlet cap and flush out the lower waterway with the water pump.
- Flushing will help keep rust scale, sand, and other debris out of the waterway seals. Flushing should be performed monthly.



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### PINNED WATERWAY



DANGER

BEFORE PINNING WATERWAY TO ITS
ALTERNATE POSITION, WATERWAY
MUST BE COMPLETELY DRAINED,
LADDER RETRACTED, AND AERIAL
AT ZERO DEGREES ELEVATION.
NEVER ATTEMPT TO UNLOCK THE
LOCKING PIN WHILE THE WATERWAY
IS IN USE. SERIOUS INJURY OR
DEATH COULD RESULT.

ENSURE THE PIN IS IN PLACE AND BUTTON ON TOP OF PIN IS POPPED OUT BEFORE WATERWAY IS PLACED UNDER PRESSURE. DAMAGE TO EQUIPMENT COULD RESULT.

NOTE: A primary concern when arriving at a fire scene is rescue capability. Therefore, it is recommended that the waterway be pinned at the mid-section as standard configuration. To attain maximum water tower operations, the monitor is to be pinned at the fly section.

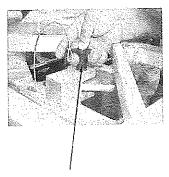
#### **MONITOR OPERATIONS**



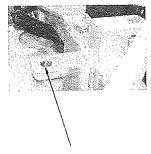
WHEN OPERATING THE MONITOR WATER NOZZLE FROM THE AERIAL TIP, THE OPERATOR SHOULD BE SECURED WITH A SAFETY BELT. MOVEMENT OF THE WATER NOZZLE CAN CAUSE ERRATIC HORIZONTAL MOVEMENT IN THE AERIAL DUE TO CHANGE IN DIRECTION OF NOZZLE REACTION FORCE. SERIOUS INJURY OR DEATH COULD OCCUR.

Electric MONITOR CONTROL toggle switches for UP/DOWN, RIGHT/LEFT, and STRAIGHT/FOG monitor functions are at the turntable control console and at the aerial tip. The controls at the console, override the tip controls. The switches are momentary contact switches, which stop monitor functions when released.

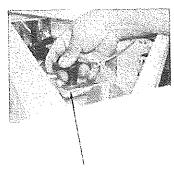
**NOTE:** See the Akron or Elkhart operator segment later in this manual.



STEP 1: REMOVE PIN FROM PRIMARY LOCKING POSITION, USUALLY AT THE FLY SECTION.



STEP 2: SLIDE MONITOR TO THE MID SECTION MAKE SURE HOLES ARE ALIGNED.



STEP 3: INSTALL PIN AT ALTERNATE PIN LOCATION.
ENSURE POPPET ON TOP OF PIN IS LOCKED OUT.



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### BREATHING AIR (OPTIONAL)

The breathing air system supplies fresh air to fire fighters during rescue operations. It is mounted at the base of the aerial ladder and is made up of air tanks, manifolds, valves, stainless steel lines and fittings, high and low pressure switches, audible and visual alarms, and fill ports.

#### Normal Operations

- 1. Open the tank valve.
- 2. Verify the high pressure gauge reads system pressure.
- 3. Verify the low pressure side of the tank reads 100 PSI.

NOTE: If the low pressure gauge does not read 100 PSI, adjust regulator by loosening the locknut and turning the schrader valve left or right to attain 100 PSI. Apply the lock nut after adjustment.

 Attach the breathing apparatus or masks at the appropriate locations at the tip of the ladder.

**NOTE:** A pressure relief valve will open if operating pressure exceeds 150 PSI.

## A WARNING

AERIAL OPERATORS MUST WATCH FOR THE LOW BREATHING AIR ALARM, WHICH WILL BE INDICATED BY THE BREATHING AIR LOW LIGHT ON THE CONTROL CONSOLE AND BY AN AUDIBLE BEEP TONE. THIS ALARM INDICATES THE TANK PRESSURE IS AT 20% OF SYSTEM PRESSURE. CEASE OPERATIONS UNTIL TANKS ARE SERVICED.

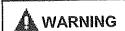
## **A** WARNING

IF OPERATIONS MUST CONTINUE,
THE AERIAL OPERATOR MUST LISTEN
FOR THE LOW PRESSURE WARNING
ALARM, INDICATING SYSTEM
PRESSURE IS AT 30 PSI. THE LOW
AIR LIGHT WILL REMAIN ON UNTIL
THE SYSTEM IS SERVICED.
OPERATIONS MUST CEASE AT THIS
TIME.

Filling the Tanks



BEFORE CONNECTING THE AIR FILL HOSE, MAKE SURE THE TANK VALVE AND INLET FILL VALVE ARE CLOSED. FAILURE TO DO SO CAN RESULT IN INJURY OR DEATH.



PERSONNEL SERVICING AIR TANKS
MUST WEAR PROTECTIVE
EQUIPMENT. SERIOUS INJURY OR
DEATH COULD RESULT.

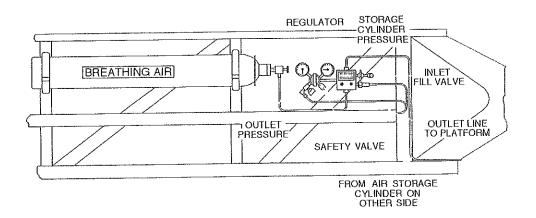
- 1. Remove fill cap from fill port located on breathing air manifold.
- 2. Using a pressurized air source, such as certified breathing air, attach the servicing hose to the fill port.
- 3. Open fill valve. This valve will stop the filling process when tanks are full.
- 4. Open the tank valve.
- 5. Once system is filled, close tank valve and close needle valve.



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6. Bleed servicing hose.

7. Remove servicing hose and replace fill cap on fill port.





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Warnings, Cautions, and Instructional Decals



VEHICLE MUST BE **OPERATORS** AND **FOLLOW FAMILIAR** WITH ON DISPLAYED INSTRUCTIONS AND CAUTIONS, WARNING, INSTRUCTIONAL DECALS. FAILURE RESULT IN TO DO SO COULD FAILURE, HARM, MECHANICAL INJURY, OR EVEN DEATH.

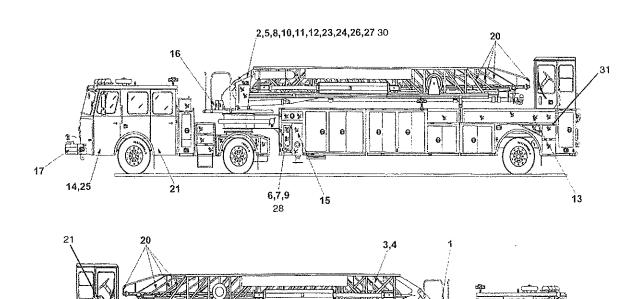
<sup>✓</sup> Replace any faded, unreadable, or damaged decals immediately. Decals are identified in each section describing the option.

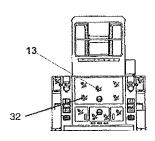


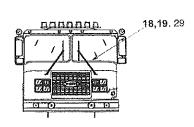
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17

21







22

21

15



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INJURY OR

MOVING MACHINERY. PERSONNEL MUST ON PLATFORM DURING OPERATION OWATS CLEAR OF MOVING AND KEEP EXTREMETIES OR RETRACT WITH EXTEND PARTS. DO TOM NOT STAND UNDER ON LADDER. DO PEOPLE LADDER DURING OPERATION. SERIOUS DEATH MAY RESULT.



576271

(1) PART #576271 MOVING MACHINERY WARNING



MONITOR NOZZLE MUST BE 90° HORIZONTAL BEFORE BEDDING LADDER. FAILURE TO DO SO MAY RESULT IN DAMAGE TO APPARATUS.



577274

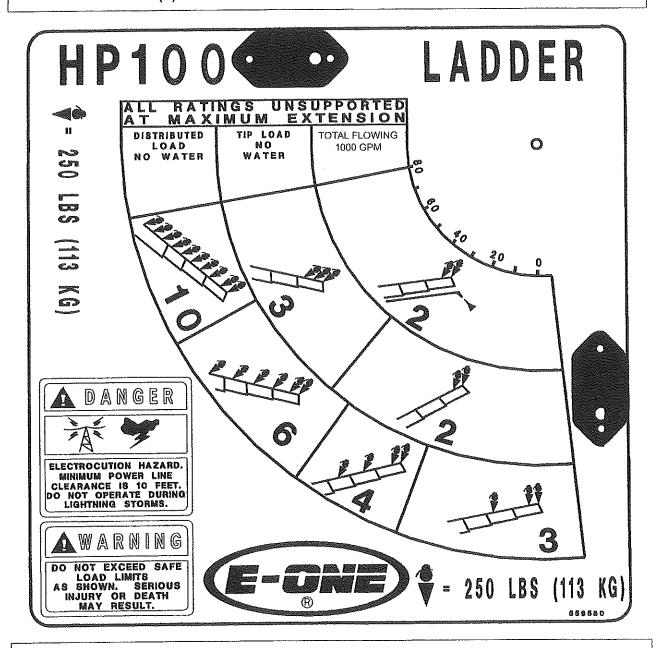
(2) PART #577274 MONITOR STOW WARNING



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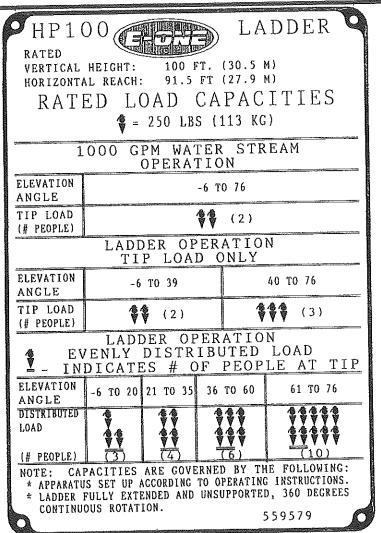
### (3) PART #447073 POINTER FOR LOADCHART



(4) PART #559580 LOAD CHART



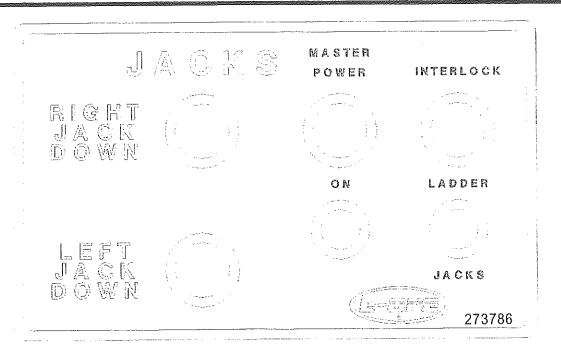
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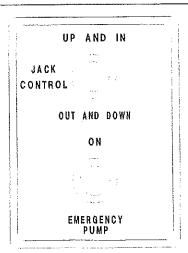
(5) PART #559579 LOAD CHART



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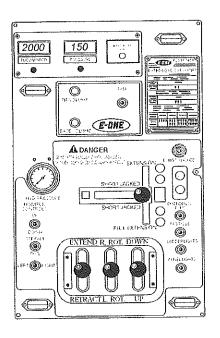
### (6) PART #273786 MASTER CONTROL PANEL



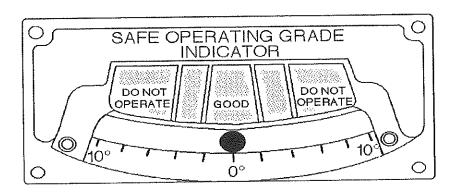
(7) PART #580849/580870 LH/RH JACK CONTROL PANELS



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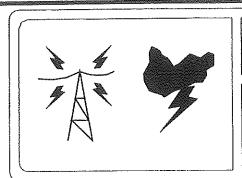
### (8) PART #582941 TURNTABLE CONTROL CONSOLE



(9) PART #900580 TRUCK LEVEL TAG
PART #900621 BUBBLE TUBE



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ELECTROCUTION HAZARD.

MINIMUM POWER LINE CLEARANCE
IS 10 FEET. DO NOT OPERATE
DURING LIGHTNING STORMS.

### (10) PART #583008 LINE CLEARANCE DANGER



USE EXTREME CAUTION WHEN OPERATING NEAR ELECTRICAL POWER LINES. MAINTAIN MINIMUM 10 FT. CLEARANCE BETWEEN POWER LINES AND AERIAL DEVICE, DO NOT OPERATE DURING LIGHTNING STORMS. CONTACT WITH POWER LINES OR LIGHTNING MNAY CAUSE SERIOUS INJURY OR DEATH.

#### OPERATING INSTRUCTIONS

- FEAD AND DESERVE ALL HISTRUCTIONS IN OFERATIONS AND MAINTENANCE MANUALS, ADMERE TO ALL SAFETY PRECAUTIONS FAILURE TO FOLLOW ALL HISTRUCTIONS MAY RESULT IN SERIOUS INJURY OR DEATH
- 2 MAKE A VISUAL INSPECTION OF THE LADDER, CABLES, HYDRAULIC LINES, PLATFORM (IF SO EQUIPPED), HYDRAULIC CYLNIDERS, ETC., BEFORE OPERATION. DO NOT OPERATE UNTIL SIGHTED PROBLEM HAS BEEN FIXED.
- 3 CHOOSE A SUITABLE LOCATION ON STABLE GROUND, TRUCK AS LEVEL AS POSSIBLE, WITH CRITICAL AWARENESS OF LOCATION OF POWER LINES, BUILDINGS, TREES, AND ANY OTHER OBSTRUCTIONS OR NAZARDS PRESENT
- 4. SET PARKING BRAKE, ENGAGE HYDFAULIC PUMP, AND WEDGE BLOCK WHEELS.
- 5 EXTEND OUTRIGGERS, LOCATE AUX. JACK PADS, AND LIFT TRUCK WEIGHT OFF CHASSIS SUSPENSION AND TIRES TO A POSITION WHERE TRUCK IS WITHIN NORMAL OPERATING GRADE OF 65 (§ 5 DEGREES)
- 6 FLIF TRANSFER SWITCH POWER FROM JACKS TO LADDER OPERATIONS
- 7 RAISE LADDER ENOUGH TO CLEAR CAB AND ANY EQUIPMENT, ETC., REFORE EXTENDING OR KOTATING, OPERATE AT LOW ENGINE IDLE WHEN MANEUVERING LADDER HEAR BUILDINGS, POWER LINES, OR IN CONFINED SPACES.
- DO NOT EXEED RATED LOAD CAPACITIES AS SHOWN. SERIOUS INJUNY OP DEATH MAY GCCUR.
- WHEH RETURNING THE LADDER TO THE STOWED POSITION, OPERATE AT LOW ENGINE IDLE SET IN FLACE WITH 1000 - 1200 PS1 "DOWN" PRESSURE AS BIDICATED ON HYDRAULIC FRESSURE GAUGE
- 10 FLIP TRANSFER SWITCH FOWER FROM LADDER TO JACKS, STOW OUTRIGGERS AND DISENGAGE HYDRAULIC PUMP.

(11) PART #291842 ELECROCUTION HAZARD

70



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DO NOT EXCEED SAFE LOAD LIMITS. SERIOUS INJURY OR DEATH MAY RESULT.

AERIAL DEVICE TO BE OPERATED BY TRAINED OPERATORS ONLY.

583020

(12) PART #583020 LOAD LIMIT WARNING



E-One Pubs No. 54223A



## **ELECTROCUTION HAZARD**

THIS MACHINE IS NOT INSULATED

MAINTAIN SAFE CLEARANCES FROM ELECTRICAL POWER LINES AND APPARATUS. YOU MUST ALLOW FOR PLATFORM SWAY, ROCK AND SAG.

THIS AERIAL DEVICE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.

DEATH OR SERIOUS INJURY WILL RESULT FROM SUCH CONTACT OR INADEQUATE CLEARANCE.



240639B

72

(13) PART #240639 INSULATION HAZARD



E-One Pubs No. 54223A

## AERIAL DAILY OPERATION AND INSPECTION

- 1 HYDRAULIC FLUID LEVEL
- 2. PINS AND RETAINERS ON HYD. CYLINDERS, EXTENSION PULLEYS
- JACKS AND PIVOTS.
  3. AUXILIARY HYDRAULIC PUMP
  4. SLIDE PADS, CLEANLINESS AND
- LUBRICATION
  5. PROPER OPERATION OF JACKS
  AND LADDER FUNCTIONS
  6. PROPER OPERATION OF AERIAL
  PLATFORM, LEVELING AND MONITOR IF SO EQUIPPED



(14) PART #240856 DAILY INSPECTION



OF STAND CLEAR JACK **EXTENSION AREA** WHILE SERIOUS INJURY OPERATING. MAY RESULT. DEATH OR



240839B

(15) PART #240839 JACK EXTENSION WARNING

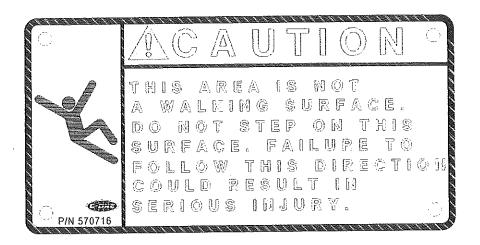
## A WARNING A

DO NOT WELD, DRILL OR MODIFY ANY PART OF TORQUEBOX OR AERIAL APARATUS STRUCTURE WITHOUT APPROVAL FROM MANUFACTURER.
SERIOUS INJURY OR DEATH
MAY RESULT FROM UNAUTHORIZED
MODIFICATIONS

(16) PART #240573 MODIFICATION WARNING



E-One Pubs No. 54223A



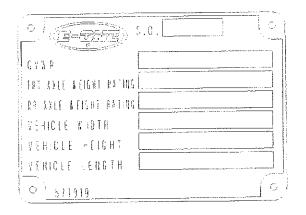
## (17) PART #570716 WALKING SURFACE CAUTION



(18) PART #549347 MANUFACTURED HEIGHT



E-One Pubs No. 54223A



(19) PART #577019 WEIGHT AND DIMENSIONS



IF TEMPERATURE INCREMENT TURNS BLACK, HARDNESS OF MATERIAL SHOULD BE TESTED CONTACT MFR. FOR DETAILS

(20) PART #2409209 HEAT INDICATOR



# **WARNING**

This vehicle is designed for carrying personnel in a SEATED POSITION ONLY. This vehicle is equipped with SEATBELTS FOR 5 PERSONS. Standing while vehicle in motion can result in SERIOUS INJURY OR DEATH Remain seated with SEATBELTS FASTENED while the VEHICLE IS INMOTION.

(21) PART #241091 SEATING CAPACITY



 $\circ$ 

## **OPERATOR MANUAL**

E-One Pubs No. 54223A

WARNING: DO NOT WORK ON OR AROUND A
TILTED CAB WITHOUT CAB SUPPORT ROD IN PLACE.

DO NOT LOWER CAB UNLESS ALL PERSONNEL ARE
CLEAR OF CAB AREA. FAILURE TO ADHERE TO THESE
INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

IF ENGINE MUST BE RUNNING WITH CAB RAISED,

SUPPORT BOD

0



CAB TILT INSTRUCTIONS

NOTE: SECURE OR REMOVE ALL LOOSE ITEMS IN CAB.

CLOSE ALL DOORS SECURELY. TURN ENGINE OFF.

DO NOT RAISE CAB WITH ENGINE RUNNING.

STAY CLEAR OF FAN, ALL BELTS, AND EXHAUST SYSTEM.

### RAISE WITH ELECTRICAL POWER:

- 1. Check overhead clearance. Stay clear of power lines.
- Push cab tilt switch to "raise" position and hold until cab is fully raised. Cab is fully raised when support rod falls into place or pump begins to relieve.
- Make sure support rod on drivers side lift cylinder is secured into position.
- Push cab tilt switch to "lower" position lowering cab slightly to lock support rod into position. Release switch.

#### RAISE MANUALLY:

- 1. Check overhead clearance. Stay clear of power lines.
- 2. Insert handle into manual pump.
- O 3. Pump until cab is fully raised.
  Cab is fully raised when support
  rod falls into place or pump begins to relieve.
  - Make sure support rod on drivers side lift cylinder is secured into position.
  - Use slotted end of pump handle to slowly turn release valve counterclockwise lowering cab slightly to lock support rod into position, Turn valve clockwise until tight. Do not overtighten.

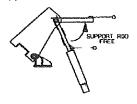
#### LOWER WITH ELECTRICAL POWER:

- 1. Clear engine compartment of all personnel, tools, and debris.
- 2. Raise cab slightly per raise instructions above to unlock support rod.
- 3. Hold support rod free with pull cord.
- Push cab tilt switch to 'lower" position and hold until cab is lowered completely and the latching mechanism at rearmost cab mount is engaged. Release switch.
- Check to see that "cab ajar" light on dashboard is not lit before attempting to start engine. If light is on, check to see if cab is firmly on rear cab latch and latch is engaged.

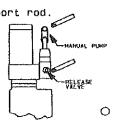
#### LOWER MANUALLY:

- 1. Clear engine compartment of all personnel, tools, and debris.
- 2. Hause cab slightly per raise instructions above to unlock support rod.
- 3. Hold support rad free with pull cord.
- 4. Use slotted end of pump handle to slowly turn release valve counterclockwise until cab begins to lower. Wait for cab to lower. After latch mechanism at rearmost cabmount is engaged turn release clockwise until valve valve is tight. On not overtighten.
- 5. Check to see that "cab a)ar" light on dashboard is not lit before attempting to start engine. If light is on check to see if cab is firmly on rear cab latch and latch is engaged.

  PART NO. 285462



0



(22) PART #285462 CAB TILT INSTRUCTIONS



E-One Pubs No. 54223A



DO NOT ALTER MONITOR HARDWARE, RATED FLOW OR SWEEP ANGLES.

EXCEEDING THE RATED FLOW AND SWEEP CAPACITY OF THE AERIAL DEVICE CAN RESULT IN SERIOUS INJURY OR DEATH.



546424

(23) PART #546424 MONITOR SWEEP WARNING

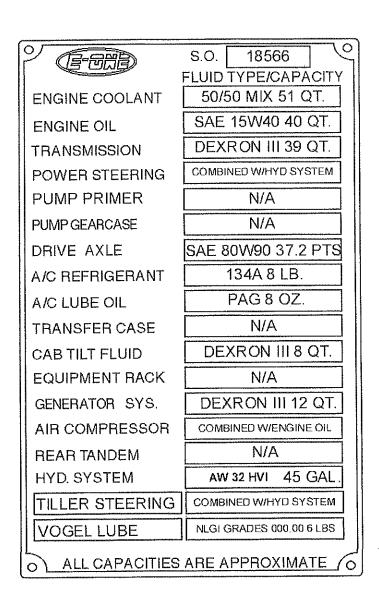


DO NOT PRESSURIZE OR
OPERATE LADDER WATER
MONITOR UNLESS PINS ARE
LOCKED IN PLACE. DEATH OR
SERIOUS INJURY MAY
RESULT. 276555

(24) PART #276555 PINNED WATERWAY WARNING



E-One Pubs No. 54223A



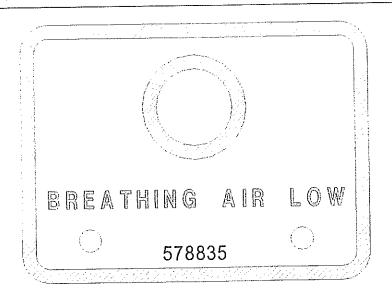
(25) PART #547005 LUBRICATION IDENTIFICATION PLATE



E-One Pubs No. 54223A



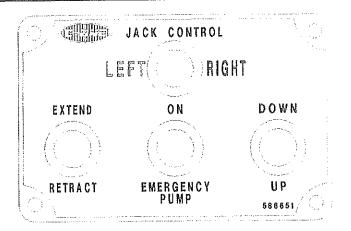
## (26) PART # 578816 COVER PLATE CONTROL CONSOLE



(27) PART # 578835 PLATE BREATHING AIR LOW



E-One Pubs No. 54223A



### (28) PART # 586651 REMOTE CONTROL PLATE

## A WARNING

BEFORE OPERATING OR RIDING IN THIS VEHICLE, READ ALL ATTACHED WARNING AND INSTRUCTION SIGNS, THE OPERATORS MANUAL, AND VIEW THE FAMILIARIZATION VIDEO (IF SUPPLIED). FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

### (29) PART # 620436 OPERATOR WARNING

## A WARNING

SECURE TIP MOUNTED EQUIPMENT. CHECK DAILY AND AFTER EACH USE THAT LADDER TIP MOUNTED EQUIPMENT IS PROPERLY SECURED AND THAT ALL RETAINERS ARE CORRECTLY INSTALLED. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

## (30) PART # 620437 TIP MOUNTED EQUIPMENT



E-One Pubs No. 54223A



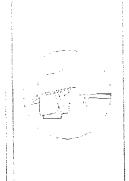


Rear step is designed to allow access to rear of vehicle when stationary. Rear step is not designed for transporting people. PERSONNEL MUST BE SEATED in cab with SEAT BELTS FASTENED while VEHICLE IS IN MOTION. Riding on rear step may result in SERIOUS INJURY OR DEATH.



241087

## (31) PART # 241087 REAR STEP WARNING



## A CAUTION

ELEPCISE CAUTION WHEN KEMOTING
PHIS TOLES AND LAMBERS, THEY
PAYE SHAMP POINTS AND EXCES. DO
NOT REMOVE ULLESS APEA 18 CLEAR
OF PERSONNEL. FAILURE TO DO SO
GOULD RESULT IN SERIOUS INJURY.

## (32) PART # 569518 PIKE POLE CAUTION

# AERIAL OPERATIONAL GUIDELINES

1. The simplicity of a well designed hydraulic system and aerial assembly allows for an individual with average ability and proper training to become proficient in operating the aerial ladder. The safe and efficient execution of the aerial assembly functions during operations will depend, in part, on the operator's capacity not to extend the limitations and safety factors of the aerial assembly design.

## **⚠** WARNING

NOT IS **ASSEMBLY** THE AERIAL KEEP THE AERIAL AT INSULATED. LEAST TEN FEET FROM OVERHEAD POWER LINES. WHEN ELEVATING THE ASSEMBLY NEAR LINES, PERSONNEL ON THE GROUND SHOULD STAND CLEAR OF THE VEHICLE, AND AVOID STEPPING ONTO OR TOUCHING THE VEHICLE UNTIL THE ASSEMBLY IS IN A SAFE POSITION WITH RESPECT TO LINES. **OVERHEAD** POWER THE PERSONNEL TOUCHING THE GROUND THE WITH AND THE VEHICLE, AN CONTACTING **ASSEMBLY POWER** LINE, WILL **ENERGIZED BECOME A PATHWAY TO GROUND FOR** ELECTRICAL CURRENT, RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

- 2. Only trained operators should be allowed to operate the aerial assembly, observing the following rules to ensure safety and operational efficiency:
  - Complete a comprehensive study of the manual and have a thorough knowledge of operating instructions, safety precautions, unit capabilities, and limitations.
  - Learn to operate the controls without looking at the control panel. Learn

- the location of each control, its function, and how it operates.
- Operate the controls smoothly to prevent jerking and erratic aerial movement. Whipping and bouncing are the most likely cause of damage to the aerial and rotation gear assembly.
- Practice basic no load operations at a low engine RPM setting, under capable supervision during initial training. Practice full load operations in simulated "on the scene" conditions.
- Do not leave the operator's control station with the aerial assembly raised, or in an operational capability.
- Do not lower the aerial on buildings, trees, telephone poles, lights, or the truck body.
- Give undivided attention to the aerial assembly during operations, if distracted, stop operations.
- Personnel must wear a personal safety harness while the aerial is in operation.
- The operator should keep their eyes on the assembly to avoid overhead electrical wires or any object that could be struck.

## $\triangle$ CAUTION

IT IS RECOMMENDED THAT A SPOTTER BE USED IN STOWING THE AERIAL DEVICE INTO THE CRADLE. FAILURE TO DO SO COULD RESULT IN PROPERTY DAMAGE.

## $\triangle$ CAUTION

THE OPERATOR SHOULD NEVER LEAVE THE OPERATOR'S CONTROL STATION DURING ON SCENE OPERATIONS. IF PERSONNEL ON THE AERIAL BECOME OVERCOME BY SMOKE OR OTHERWISE INCAPACITATED, THE OPERATOR CAN MOVE THE AERIAL TO A SAFE LOCATION.

- Perform inspection of the aerial assembly and outriggers daily.
   Perform weekly operational tests to ensure unit readiness.
- Note and report any signs of trouble before or during operation, paying particular attention to the following:
- Drifting hydraulic cylinders.
- Excessive oil pressure, oil leaks, and excessive oil consumption.
- Unusual noise or vibrations in the hydraulic pump.
- Erratic movement of the aerial, turntable, outrigger jacks, or function controls.
- Metal particles, sand, or other contamination on the aerial extension slide surfaces, outrigger jacklegs, or cylinder rod surfaces.
- Unlubricated aerial extension slide pads, or outrigger jack leg slide surfaces, pulleys, and retainers.

### SITE LOCATION

1. The vehicle should be positioned at a suitable location where the ground is stable and the vehicle will be as level as possible. Maximum outrigger jack loads are generated during operation of the ladder assembly at full extension and low elevation to the side of the vehicle.

- 2. Use good judgement in a potentially precarious situation to not jeopardize vehicle stability. Take into consideration the following conditions:
  - Overhead power lines within TEN FEET of the aerial extension or other obstructions. The aerial ladder is not insulated and becomes a direct line for electrical flow.
  - Reach capability of the aerial assembly to required area. Refer to the safeload and reach charts outlined later in this section.
  - Hot and/or soft asphalt where outriggers may sink and cause the vehicle to become unstable.
  - Soft earth or ground erosion caused by hydrant or supply hose run-off water or rain.
  - Frozen ground thaw caused by vehicle created heat.
  - Retaining wall heights, open construction areas, underground parking ramps, or garages.
  - Underground drain or sewer pipes.



OUTRIGGER PADS SHOULD NOT BRIDGE CURBS, DITCHES, GULLIES, OR RUN-OFF DRAINS, OR BE PLACED OVER MANHOLE COVERS.

• Under all conditions, use wheel chocks under the front wheels.

# LOAD CAPACITY AND TIP LOAD CHARTS

The Load Capacity Chart and Tip Load charts are mounted at the control console and the base of the aerial assembly on the left side. To ensure safe operations, the following general guidelines must be adhered to:

- Learn the load capacities of the aerial device.
- Do not rely on memory. Refer to the charts before operating the aerial.
- Never exceed the published load limits.
- Distribute the weight on the aerial device evenly. Ten feet between personnel recommended.

### WINDY CONDITIONS

Aerial assembly operations are not recommended with wind speeds in excess of 35 MPH. Operations with full load and extension are capable of being performed by the ladder assembly within the 35 MPH wind speed limit.

### EXTREME HEAT CONDITIONS

 If the aerial assembly is exposed to extreme heat during operation, thoroughly inspect the assembly, directing particular attention to the ladder extension slide pads, cables, waterway seals, pulleys, and hydraulic lines.

 $\triangle$  danger

IF HARDNESS READING FALLS TO 70, CONTACT EMERGENCY ONE. IF HARDNESS READING FALLS TO 60 OR LOWER, REMOVE THE AERIAL FROM SERVICE AND CONTACT EMERGENCY ONE IMMEDIATELY.

2. The aerial should be inspected and tested in accordance with NFPA-1914 standard testing. Check the heat indicators located at the tip of each aerial section on the forward facing brace. If the heat indicator turns black, have the aerial tested using a Barber-Coleman Model GYZJ 934-1 portable hardness tester, check the aerial material for hardness. Normal hardness readings should fall between 78 to 82.



IF TEMPERATURE INCREMENT TURNS BLACK, HARDNESS OF MATERIAL SHOULD BE TESTED CONTACT MFR. FOR DETAILS

### FREEZING CONDITIONS

 A substantial build-up of ice is very probable in freezing weather when operating a waterway system on the aerial assembly.



WHEN OPERATING IN FREEZING OR SALT CONDITIONS, SAND SHOULD BE USED UNDER THE JACK PADS TO KEEP THE VEHICLE FROM SLIDING WHEN THE AERIAL IS IN THE **EXTENDED** POSITION. SERIOUS DAMAGE TO EQUIPMENT OR DEATH INJURY ON PERSONNEL THE **AERIAL** DEVICE COULD OCCUR.

# AERIAL MONITOR AND WATERWAY

**OPERATION** 

**⚠ WARNING** 

WHEN OPERATING THE NOZZLE FROM AERIAL TIP THE OPERATOR THE SHOULD BE SECURED WITH A SAFETY BELT. MOVEMENT OF THE WATER CAN CAUSE ERRATIC NOZZLE **MOVEMENT** THE IN HORIZONTAL AERIAL DUE TO SUDDEN CHANGE IN DIRECTION OF THE NOZZLE THE REACTION FORCE. SERIOUS INJURY OR DEATH COULD OCCUR.

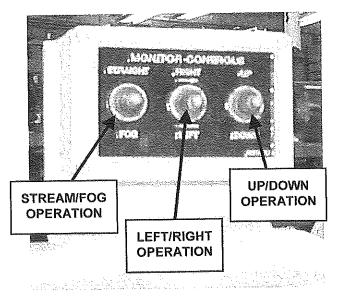


1. The monitor can be controlled from the turntable control console or the aerial tip.

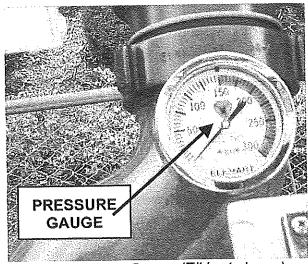
**NOTE:** The monitor can also be controlled from the optional pump control panel.

- 2. A gel-cell battery supplies power to the monitor if the remote panel is used.
- 3. The monitor nozzle functions include elevation, sweep, and stream patterns.
- The monitor is capable of a maximum vertical travel of 135 degrees and a horizontal travel of 90 degrees. The

- stream pattern varies from straight stream to full fog patterns.
- 5. The flow capacities for the nozzle vary from 250-1250 GPM. The water pressure at the pump panel should read approximately 180-200 PSI to maintain the rated capacity at the monitor (80 PSI for Akron nozzles and 100 PSI for Elkhart).



Control Pad



Typical Pressure Gauge (Elkhart shown)

### WATERWAY DRAINING

- 1. Always drain the waterway system after use (particularly in extremely cold weather).
- 2. With the rear drain valve completely open, raise the aerial to its maximum elevation to allow water to completely drain from the waterway.

**NOTE:** Full extension is required to complete waterway draining.

## FLUSHING LOWER WATERWAY

 On vehicles equipped with a prepiped waterway and a water pump, remove the rear inlet cap and flush out the lower waterway with the water pump.

**NOTE:** Flushing will help keep rust scale, sand, and other debris out of the waterway seals. Flushing should be performed monthly.



E-One Pubs No. 54420A

## **Aerial Rope Rescue Guidelines**

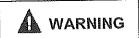
EMERGENCY ONE has designed a double pulley rope system specifically for use one EMERGENCY ONE aerial ladders (HP70', HP75', CR100', HP100', HM100', 110', 135'). The pulley is designed to mount at the tip of the ladder fly section and is retained in place by two locking pins.

The following rules should be followed when using this system. Specific operating procedures should be developed by individual fire departments based on these basic rules.

- The waterway (if applicable) must be pinned to the ladder section below the fly section.
- The double pulley rope rescue assembly must be installed on the last two rungs at the tip of the fly section and locked in place with the two retainer pins.
- 3. Two rescue ropes should be anchored at the base of the ladder by use of a "figure 8" harness attached around the base of the ladder section main pivot plates.
- Each pulley is rated for one person load (as defined in NFPA 1901, 1999 edition) of 250 pounds for a total rated load of 500 pounds for the assembly.

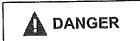


5. The weight of personnel and equipment suspended from the ladder must be deducted from the tip load allowance as shown on the aerial load chart.



SERIOUS INJURY OR DEATH MAY RESULT IF THE AERIAL LOAD CHART IS NOT FOLLOWED AT ALL TIMES.

6. The ladder extend/retract function should be the primary method for raising and lowering loads from suspended from the double pulley rope rescue system. Extend/retract allows the smoothest starting and stopping of the load.



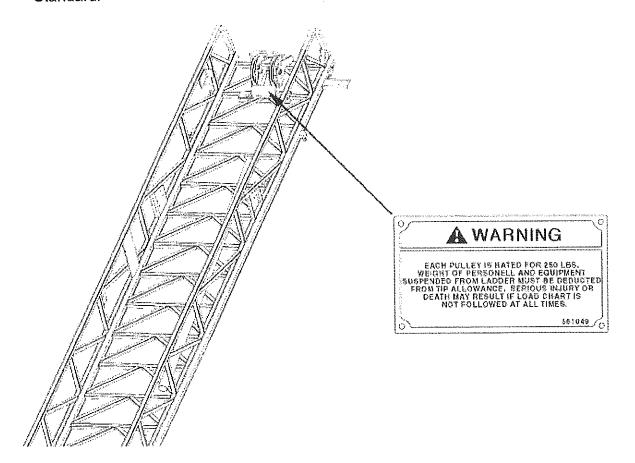
THE EMERGENCY ONE INC. ROPE
RESCUE SYSTEM IS NOT INTENDED
FOR RAPELLING OPERATIONS FROM
ANY AERIAL LADDER. SERIOUS
INJURY OR DEATH MAY RESULT IF
THE RESCUE SYSTEM IS USED
IMPROPERLY FOR RAPELLING.

 Specific rope and stokes basket rescue evolutions are the responsibility of the



E-One Pubs No. 54420A

end user. Rope diameters, caribiners size, harnesses, and attachment systems should be developed in compliance with NFPA 1983, Life and Safety Rope System Components Standard.





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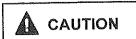
## **EMERGENCY PROCEDURES**

### **EMERGENCY PUMP**

The hydraulic system is designed with an auxiliary power unit. The auxiliary power unit is a 12-volt pump connected to the chassis electrical system. The motors use the vehicle batteries as their power source. The pump provides operation at reduced speeds to store the aerial device and stabilizers for road transportation. Self-centering switches are provided at the turntable and each stabilizer control station to activate the system. The system is designed to provide a minimum of 5 minutes of hydraulic power to operate functions.

### Operation

1. The boom and outriggers may be moved to the stowed position in case the main hydraulic pump malfunctions or the vehicle engine stalls.



THE AUXILIARY PUMP MOTOR IS NOT INTENDED FOR OR DESIGNED **OPERATION** USE. CONTINUOUS THE TO LIMITED SHOULD BE NECESSARY TIME TO RETURN THE AND **ASSEMBLY AERIAL** STOWED THE **OUTRIGGERS** TO POSITION. DAMAGE TO PUMP WILL RESULT.

2. The auxiliary hydraulic pump is driven by a 12-volt DC electric motor that uses the vehicle batteries as its power source.  Use of the auxiliary pump will enable operation of all hydraulic functions, but not simultaneous operation. The operational speed of each function will be reduced due to a substantially lower GPM flow than the main hydraulic pump.

NOTE: One momentary contact switch to activate the auxiliary pump is located at the rear operator's control station for boom and outrigger assembly operation, and two switches located at the rear of the vehicle for outrigger operation. Optional switches may be located at the pump operator's station.

- 4. Activate the auxiliary pump by holding the momentary contact switch to *ON*, while simultaneously operating the retract, rotate, or lower control levers. After operations have been completed, release the momentary contact switch to halt auxiliary pump operation.
- 5. To manually activate the auxiliary pump for outrigger operations, hold the momentary contact switch, located on the rear panel, in the *ON* position. Operate the right and left *JACK* levers to raise and stow outriggers. Release the momentary contact switch to halt auxiliary pump operation.

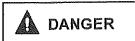
NOTE: If outrigger jacks fail to complete full cycle of retraction, the dual sequencing valves may be set too high to allow operation at the reduced GPM and PSI output of the auxiliary pump. Refer to OUTRIGGER PROGRESSIVE OPERATION in the Service manual.



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### **EMERGENCY SHUTDOWN**

1. If a failure or rupture in the hydraulic system occurs, operations should be halted immediately.



**HYDRAULIC** HIGH **PRESSURIZED** DURING IS PRESENT FLUID SYSTEM. RUPTURE N THE PERSONNEL SHOULD STAY CLEAR OF ANY RUPTURED COMPONENTS SHUTDOWN **EMERGENCY** UNTIL HAVE BEEN PROCEDURES FAILURE TO DO SO COMPLETED. WILL RESULT IN INJURY OR DEATH.

2. Depending on the failure or rupture location, it may be necessary to shut down the hydraulic pump by disengaging the PTO, or stopping the vehicle engine. Not operating a particular control in-line with a rupture may be sufficient action to stop fluid from being ejected.



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## **AERIAL CLEANING PROCEDURES**

Periodic cleaning is required to keep the aerial device operational. Refer to checklists for specific cleaning requirements.

### SAFETY



PERSONAL PROTECTION EQUIPMENT IS REQUIRED. FAILURE TO FOLLOW PERSONAL PROTECTION PROCEDURES MAY RESULT IN SERIOUS INJURY OR EVEN DEATH.

Personal protective equipment includes any of the following items:

- Eye protection: safety goggles, face shields, or approved safety glasses.
- Foot protection: steel toed boots or shoes with oil or slip resistant soles.
- Hand protection: rubber gloves, or heavy industrial gloves.
- Body Protection: rubber apron or work coveralls.
- Respiratory protection: respirator mask.



USE A RESPIRATOR MASK APPROVED FOR SPECIFIC CHEMICALS ONLY. A STANDARD FIBER MASK IS NOT ACCEPTABLE. THE FIBERS IN THE MASK HOLD THE VAPORS AS YOU CONTINUE TO BREATHE. THIS CAN RESULT IN BRAIN DAMAGE OR EVEN DEATH.

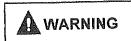
### COMPRESSED AIR

Use of compressed air can create an environment of propelled foreign particles. Air pressure should be kept at 30 PSI or less and used with effective eye protection.

### PERSONAL ITEMS

Remove jewelry, tuck in loose clothing, and put up long hair that may get entangled in moving parts on the aerial device during cleaning. Smoking is prohibited while working with flammables.

### CHEMICALS AND CLEANERS



KEEP CHEMICALS AND CLEANERS IN APPOVED SAFETY CONTAINERS AND SOME IN MINIMUM QUANTITIES. CHEMICALS CAN HAVE ADVERSE EFFECTS ON THE SKIN, EYES, AND RESPIRATORY TRACT. OBSERVE THE MANUFACTURER'S WARNING LABELS AND CURRENT SAFETY DIRECTIVES. USE CHEMICALS AND CLEANERS IN DISPOSE OF AUTHORIZED AREAS. AMD CLOTHES SOILED ALL IN **MATERIALS** CLEANING LOCAL WITH ACCORDANCE REGARDING INSTRUCTIONS HAZARDOUS WASTE.

## APPROVED CLEANERS AND MATERIALS

- M600, mineral spirits, or a nonchlorinated solvent.
- Spray bottle or an air pressurized container.
- Clean rags.



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NEVER USE GASOLINE, KEROSENE, OR DIESEL FUEL TO CLEAN AERIAL DEVICE.

### SETUP AND CLEANING

- 1. Perform standard aerial set up procedures, then rotate aerial to the rear of the unit.
- 2. Fully extend the aerial and keep level with the ground.
- 3. Spray all tracks inside and out (including electrical trolley and cable trolley). Let stand for 5 minutes.

- 4. Wipe area clean until no grease is present on the rag.
- Use caution while walking ladder rungs.

### **CLEANING INTERVALS**

- Cleaning should be performed at least once a month with light use. Sooner with heavier use.
- 2. Cleaning should be performed after every involvement with fire if possible.
- 3. As the aerial checklists dictate.

**NOTE:** Parking the aerial under trees will increase the need for cleaning and may also increase the likelihood of damage to the tracks.



# **SERVICE MANUAL**

E-One Pubs No. 54053D

# Recognized Aerial Lubricants for E-one Aerials and their Manufacturers

1. Lubricant for all aerial nylatron pads, slides, guides, load transfer pads, tracks, pulley bearings, E-One manufactured waterway tubes, water monitor gears, and jackleg slide surfaces (Lube ID is SPLB, WLG, and WLS):

a)	White Lithium with Teflon	376534	QMI	Prod.# 2550
b)	White Lithium w/o Teflon	520017	NAPA	Prod.#14G SILOO
c)	Wurth HHS 2000	NPN	Wurth	Prod.# HHS 2000

2. Lubricant for all aerial jackleg pivot pins, all aerial jackleg and cylinder pins, turntable inner bearing, and all other lube points that are lubed through a zerk fitting (with the exception of the J&J waterway couplings. Lube ID is EP):

a)	Polyeura EP2	52004	9	Valvoli	ne	Prod.# 611
•	Moly 2	NPN		Chevro	on	Prod.# Moly 2
c)	Polylube 2	NPN		D.A.		Prod.# Polylube 2
3.	Lubricant for J&J wat	erway	(Lube	ID is W	/LG):	
a)	Optimal Long Time		NPN		Castrol	Prod.# PD2
b)	White Lithium with Tefl	on	37653	4	QMI	Prod.# 2550
c)	White Lithium w/o Teffo	on	52001	7	NAPA	Prod.#14G SILOO
4.	Gear oil for rotation d	lrives (	Lube I	D is Gl	_):	
a)	Mineral Gear Lube 90		NPN		Unocal	Prod.# 050208
b)	Regular Gear Oil 90W		NPN		Citgo	Prod.# 31502
c)	Gear Lube		52004	Ļ	Valvoline	Prod.# 508
5.	Lube for open faced	gears (	Lube I	D is SC	3L):	
a)	Dynagear Extra		NPN		Exxon	Prod.# 415158
b)	Open Gear Grease		NPN		Chevron	Prod.# 230002
c)	Open Gear All Season	s	NPN		DA (35#)	Prod.# 12049
•					Or DA (tube)	İ
6.	Lube for Hydraulic S	ystem	;			
a)	5W-20 AW 32 Hydraul	ic Oil	52003	34	Valvoline	Prod.# HVI AW32
b)	AWX 5W-20 Hydraulic	: Oil	NPN		Pennzoil	Prod.# AWX-32
,	Premium Hydraulic Oi		NPN		Shell Oil	Prod.# Tellus 32
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(Please consult aerial maintenance manual for each particular aerial type to obtain further details about lubrication)

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E-ONE AERIALS		
Õ		1. Inspect jack system for
유	AERIAL MASTER PANEL	operation.  2. Inspect control switches for proper operation.
F	F Pittle	3. Inspect master switch operation indicator light function.
Z Z	LADDER	Inspect extension and retraction cables for tension, fraying, and proper fastening.
OPERATOR DAILY CHECKLIST FOR	ASSEMBLY	2. Inspect pulley pins, retainer plates, and snap rings for proper fastening.
Z		Inspect all ladder functions for proper operation.
K		2. Inspect up/down operation.
Z ATC		Inspect extension/retraction operations.
		4. Inspect left/right rotation (note any unusual noises during operation).
	LADDER OPERATIONS (CONTROL STATION)	5. Inspect pressure gauge for normal hydraulic pressure (1000-2700 psi).
		6. Inspect valve controllers for proper operation.
		7. Inspect all switches and panel lights for proper operation.
		8. Inspect monitor controls and intercom operation.
		9. Clean any mud, oil, or grease off the turntable deck.

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OPERATOR DAILY CHECKLIST FOR E-ONE AERIALS		
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	LADDER LIFT CYLINDERS	Inspect tightness of pin retainer rings and mounting bolts, and pivot pins.
		Inspect valve controllers for proper operation.
		2. Inspect waterway monitor controls.
	HYDRAULIC RESERVOIR	Inspect fluid level (system stowed and oil at ambient temperature).

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ERIALS		DATE
N N	ALL	1. Perform all daily checks.
ERATOR WEEKLY CHECKLIST FOR E-ONE AERIALS	LADDER OPERATIONS (CONTROL STATION)	Inspect handrail fasteners for tightness (tighten loose bolts).      Inspect base control station mounting bolts for tightness (tighten loose bolts).      Inspect for cracked or damaged welds.      Inspect hydraulic lines and fittings for leakage and fastening.
OPERATOR WEEKLY	OUTRIGGERS	1. Inspect jack pad pivot pins, retainer rings, and retainer plate bolts.  2. Inspect jack pad pivot pins for freedom of movement.  3. Inspect cylinder rod seal for leakage (static leaking is normal).  4. Inspect cylinder rod for scoring.  5. Inspect valves, hydraulic lines, and fittings for leakage and fastening.  6. Inspect mounting bolts for tightness (tighten if necessary).
	BREATHING AIR SYSTEM	1. Record tank pressure(s).  #1 Cylinder  #2 Cylinder  2. Inspect regulator for set working pressure (not to exceed 150 psi).  3. Inspect for leaks or system damage.  4. Inspect warning alarm system at operation station.

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NE AE		Inspect extension/retraction cable adjustment rod locknuts for tightness.
R E-0	LADDER ASSEMBLY	2. Inspect ladder extension slide pads for wear, damage and fastening on all sections.
RATOR WEEKLY CHECKLIST FOR E-ONE AERIALS		3. Inspect slide tracks and pads for sand, metal shavings or foreign particles (if metal shavings are found, locate source and correct the problem). Clean and relube.
EKLY CH		4. Inspect ladder slide track lubricant (if lubricant has dirt particles in it, clean and re-lube).  5. Inspect for cracked or damaged
Name of the last o		welds.  1. Inspect all jack light functions.
OPERATOR	MASTER CONTROL PANEL AND JACK SWITCHES	2. Inspect jack/ladder interlock functions and indicator light operations (with ladder approx.  1" out of cradle). Note: Jacks should not operate.
O	AUXILIARY	Check for proper operation.
	HYDRAULIC 2	2. Inspect hydraulic fittings and lines for leakage.
	HYDRAULIC PUMP	Inspect operation of PTO and hydraulic pump for leaks.
		Inspect hydraulic lines for leakage and fastening.
	HYDRAULIC	1. Inspect hydraulic lines and
	SWIVEL	fittings for leakage.  1. Inspect hydraulic fittings and
}	ROTATION GEAR BOX	lines for leakage.  2. Inspect control valve fittings and lines for leakage.

OPERATOR WEEKLY CHECKLIST FOR E-ONE AERIALS		INSPECTED BY
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	LADDER LIFT CYLINDER	Inspect cylinder for leakage (slight weeping is normal).      Inspect cylinder rod scoring.
		3. Inspect lock valves and hydraulic lines for leakage and fastening.
ATOR WE	EXTENSION/ RETRACTION CYLINDER	Inspect cylinder for leakage (slight weeping is normal) and rod scoring.
		Inspect cylinder rod scoring.
		3. Inspect velocity fuses, hydraulic lines and fittings for leakage and fastening.
		Inspect pin retainer rings and mounting bolts for tightness.

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E-ONE AERIALS		AERIAL		
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L L	ALL	Perform all daily checks.		
S		Perform all weekly checks.		
Ž	OUTRIGGERS	3. Grease all jack fittings.		
Ē	HYDRAULIC RESERVOIR	4. Inspect fill cap, hydraulic lines, fittings, and tank for leakage.		
ΓΥC	WATERWAY MONITOR	Inspect all operating functions.  Lubricate monitor.		
Ī	WATERWAY	Inspect waterway tubing and clean. Re-lubricate.		
Q		Lubricate waterway seals.		
K		Lubricate swivel joints.		
PTO	LADDER ASSEMBLY	Clean and inspect ladder assembly. Re-lubricate.		
OPERATOR MONTHLY CHECKLIST FOR	ELECTRICAL CONNECTIONS	1. Inspect terminal strip wire connections inside control station, and monitor locations for tightness and corrosion.		
	LADDER LIFT CYLINDER	Grease ladder pivot pin fittings.      Grease ladder lifting cylinder pins.		

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Z		Perform all daily checks.
ш	ALL	Perform all weekly checks.
<u>R</u>		Perform all monthly checks.
F	HYDRAULIC RESERVOIR	Replace breather element on filler cap.
CKLIS		Drain and flush reservoir.     Keep oil sample for lab analysis.
H		3. Clean magnetic suction strainer.
3LY (		4. Replace pressure and return filters.
EAF		5. Inspect mounting bolts for tightness (tighten if loose).
OPERATOR YEARLY CHECKLIST FOR E-ONE AERIALS		Inspect rotation gear box for proper mesh with turntable gear for wear and tear or damage.
Ш	ROTATION GEAR	Drain and refill gear box.
0		Clean and grease rotation and turntable gears.
12		4. Check mounting bolt torque. If a bolt comes loose, replace and retorque. NOTE: Bolt must be replaced with proper SAE grade and inspected by the manufacturer. Consult chart for application requirement