



## *102' Rear-Mounted Aerial Operation and Maintenance*



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# FORWARD

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## **PURPOSE**

This manual has been written to familiarize operators and maintenance personnel with the KME Rear-Mounted 102' Aerial characteristics.

The intent of this publication is to outline operational procedures, prescribe general safety parameters and to provide guidance or general maintenance and service requirement. No attempt will be made to present detailed operational procedures as circumstances and the ingenuity of those confronted by them will far exceed any present concept of application.

Only trained personnel should operate this vehicle or perform maintenance. Proper service equipment and tools must be used and appropriate safety practices followed to prevent personal injury or equipment damage.

Personnel involved in the use of this equipment must be aware of the potential dangers produced by disregard of safety rules, lack of consideration of capacity limitations or improper operational and maintenance procedures.

This manual should be kept with the apparatus at all times.

## **TO THE OPERATOR**

This portion of the manual has been prepared to provide all the information needed to operate the KME 102' Aerial. To obtain the most satisfactory performance and assure maximum safety and comfort, complete knowledge of your apparatus and correct operating practices are necessary.

This manual contains information on basic, optional and at times special equipment which may vary depending on apparatus model. The specifications and information throughout this manual are up to date at the time of publication; however, it is subject to change without notice. This information can be used in normal operation or when emergencies or abnormal conditions occur.

As the name implies, this is a custom unit that may contain devices specific or unique to your department. For that reason some of the information contained herein may be generic in nature. Major discrepancies may be directed to KME headquarters, one of the KME Branch Service Centers, or to your KME Dealer Representative.

This operator's manual provides operating and maintenance instructions for vehicles manufactured by KME Fire Apparatus.

This manual provides information under the following headings:

AERIAL OVERVIEW  
AERIAL DEVICE GENERAL DESCRIPTIONS  
AERIAL OPERATIONS  
SAFETY PRECAUTIONS  
AERIAL TROUBLESHOOTING  
AERIAL DEVICE GENERAL MAINTENANCE

To order a replacement manual contact your dealer or sales representative or contact the nearest KME factory branch:



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Nesquehoning, PA 18240  
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Fax: (570) 669-5124  
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(909) 937-1762 Fax  
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## TO THE OWNER

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

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

KME Fire Apparatus provides the services of a delivery technician before the unit is placed into service to train the department personnel in the safe and proper method of operation. It is the department's responsibility to provide future training, qualification documentation, and to qualify its operators.

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

## WARNING AND CAUTION STATEMENTS



and



statements have been strategically placed throughout this text prior to operating or maintenance procedures, practices or conditions considered essential to the protection of personnel (**WARNING**) or equipment and property (**CAUTION**).

A **WARNING** or **CAUTION** will apply each time the related step is repeated. Prior to starting any task, the **WARNINGS** and **CAUTIONS** included in this text for that task will be reviewed and understood.

Study this manual and the component operator manuals found in the service manual carefully and ensure that all operators and other users are fully familiar with their contents. The warnings, cautions, and procedures listed in these manuals must be incorporated into the safety program of the fire department to which the vehicle is assigned.

## SAFETY SUMMARY

The following are general safety precautions and instructions that people must understand and apply during many phases of operation and maintenance to ensure personal safety and health and the protection of equipment. Portions of this may be repeated elsewhere in this publication for emphasis.

### DO NOT WEAR JEWELRY

Remove rings, watches, and other metallic objects, which may cause shock or burn hazards.

### FINGER RINGS

Snagged finger rings have caused many serious injuries. Unless specifically allowed by shop safety procedures, remove finger rings during all maintenance activity.

### DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment of equipment unless another person capable of rendering aid and resuscitation is present.

### DANGEROUS PRESSURES

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*102' Rear-Mount Aerial*

Pressure systems precautions apply to all ranges of pressure. Care must be taken during testing to ensure that all connections are proper and tight prior to applying pressure to test setup; All system components must be compatible with pressures applied. Personnel must be protected by a safety shield or located at a distance sufficient to prevent injury.

### **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Wear protective clothing/equipment (gloves, apron, eye protection, etc.) approved for the materials, procedures, and tools being used. Contact Supervisor for guidance. If necessary, the Bio-environmental Engineer or the Base Safety Office would be contacted for guidance.

### **LEAKS IN EXHAUST MANIFOLDS**

Leaks in exhaust manifold, mufflers, or piping must be corrected immediately. Fumes escaping into the cab can result in carbon monoxide poisoning of operating personal.

### **MOUNTING/DISMOUNTING VEHICLE**

Use extreme caution when mounting and dismounting vehicle and opening engine and vehicle compartments.

### **AUXILIARY GENERATOR**

Do not connect auxiliary generator to any building's electrical system without a transfer switch installed by a licensed electrician. Serious injury or death may result to utility workers and others through hazard of electrical back feed.

### **TIRES**

Never add air to a tire if its pressure has fallen below 20 psi. The lock ring may become unseated and may fly off when pressure is added. If pressure is below 20 psi, have the tire removed and placed in a tire cage before inflating.

### **VEHICLE HANDLING CHARACTERISTICS**

Safe operation of any vehicle is the responsibility of the driver. Heavy trucks have a significantly higher rollover tendency than other types of vehicles, due to a higher center of gravity. To reduce the risk of rollover, avoid making sharp turns at excessive speeds and other abrupt maneuvers. In the event of a rollover crash, an unbelted person is significantly more likely to become injured or die than a person wearing a seatbelt.

**ALWAYS BUCKLE UP**



**THE FOLLOWING PLACARDS ARE PLACED AT VARIOUS POSITIONS ON THE APPARATUS. FAILURE TO ACKNOWLEDGE AND FOLLOW THESE CAUTIONS AND WARNINGS CAN RESULT IN INJURY AND DEATH TO OPERATORS AND/OR PERSONNEL IN THE VICINITY OF THE APPARATUS**

## **WARNING**

**This vehicle has been supplied with seats and seat belts for 6 occupants. No other riders are permitted.**

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### **SAFETY BAR OPERATION**

#### **TO SET BAR:**

1. RAISE CAB APPROXIMATELY 45°.
2. UNLOCK HANDLE-1/8 TURN.
3. PULL HANDLE OUT WHEN BAR JUST CLEARS TOP CYLINDER BODY.
4. LOCK HANDLE-1/8 TURN.

#### **TO RELEASE BAR:**

1. UNLOCK HANDLE-1/8 TURN.
2. PUSH HANDLE IN COMPLETELY.
3. LOCK HANDLE-1/8 TURN.
4. LOWER CAB.

## **CAUTION**

**OPERATOR MUST FOLLOW THESE RULES WHEN OPERATING CAB TILT SYSTEM**

1. CONTACT K.M.E. WITH ANY QUESTIONS REGARDING TILT PROCEDURE.
2. DO NOT OPERATE SYSTEM IF QUESTIONABLE SITUATION OF COMPONENTS OCCURS.
3. OBSERVE CAB MOVEMENT AND REMAIN OUTSIDE CAB ARC UNTIL LOCKING BAR IS SECURED IN PLACE.

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# **⚠ WARNING**

## **FAILURE TO OBEY THE FOLLOWING CAN RESULT IN DEATH OR SERIOUS INJURY**

1. Inspect vehicle and Aerial Device, including operation **DAILY** prior to use.
2. For stationary operation vehicle must be securely parked and stabilized for the work to be performed before Aerial Device is operated.
3. Outriggers must be on solid footing to prevent tip-over.
4. Operators shall wear a body belt, and attach with a lanyard to ladder or platform. Platform doors must be securely latched.
5. Operate all controls slowly for smooth motion.
6. Do not load beyond rated capacity.
7. Operator must wear proper protective gear.

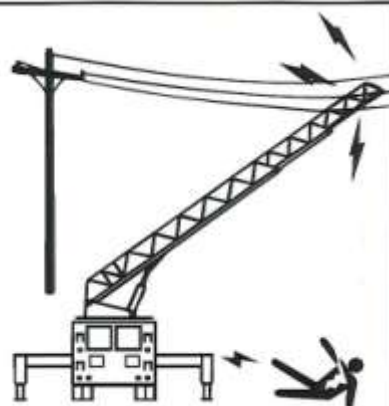
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# **⚠ DANGER**

## **ELECTROCUTION HAZARD**

**DEATH OR SERIOUS INJURY** can result from contact with this machine or vehicle if it should be electrically charged.

**KEEP CLEAR OF TRUCK  
AND ATTACHMENTS**



<b>! DANGER</b>	
<b>ELECTROCUTION HAZARD</b>	
<b>PUMP OPERATOR <u>MUST</u> UTILIZE WORK PLATFORM WHEN AERIAL DEVICE IS IN OPERATION.</b>	

<b>! DANGER</b>
<b>ELECTROCUTION HAZARD</b>
THIS MACHINE IS NOT INSULATED
<b>DEATH OR SERIOUS INJURY</b> WILL RESULT FROM CONTACT WITH OR INADEQUATE CLEARANCE, FROM ENERGIZED CONDUCTORS
<b>MAINTAIN SAFE CLEARANCES</b> FROM ELECTRICAL POWER LINES AND APPARATUS.
<b>YOU MUST ALLOW</b> FOR PLATFORM SWAY, ROCK, OR SAG.

<b>! WARNING</b>
<b>DO NOT MOVE APPARATUS WHEN LIGHT IS ON</b>





# **WARNING**

**THE WATERWAY MONITOR  
MUST BE IN THE RAISED  
POSITION BEFORE BEDDING  
THE LADDER**

21

# **DANGER**

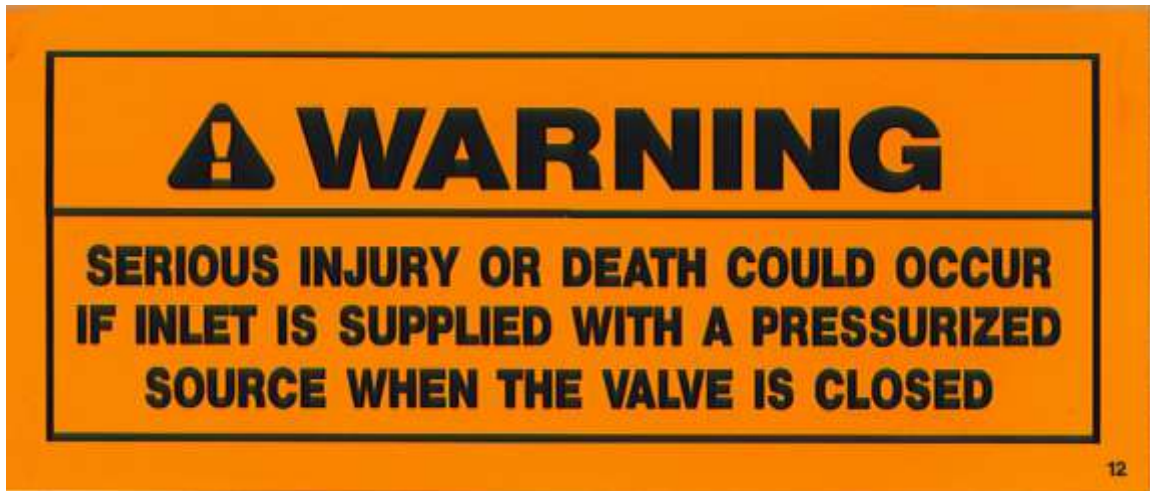
**AN UNTRAINED OPERATOR  
SUBJECTS HIMSELF AND  
OTHERS TO**

**DEATH OR SERIOUS INJURY**

**YOU MUST NOT OPERATE  
THIS MACHINE UNLESS**

- **You have been trained in the safe operation of this machine.**
- **You read, understand and follow the safety and operating recommendations contained in the machine manufacturer's manuals, your employer's work rules and applicable government regulations.**



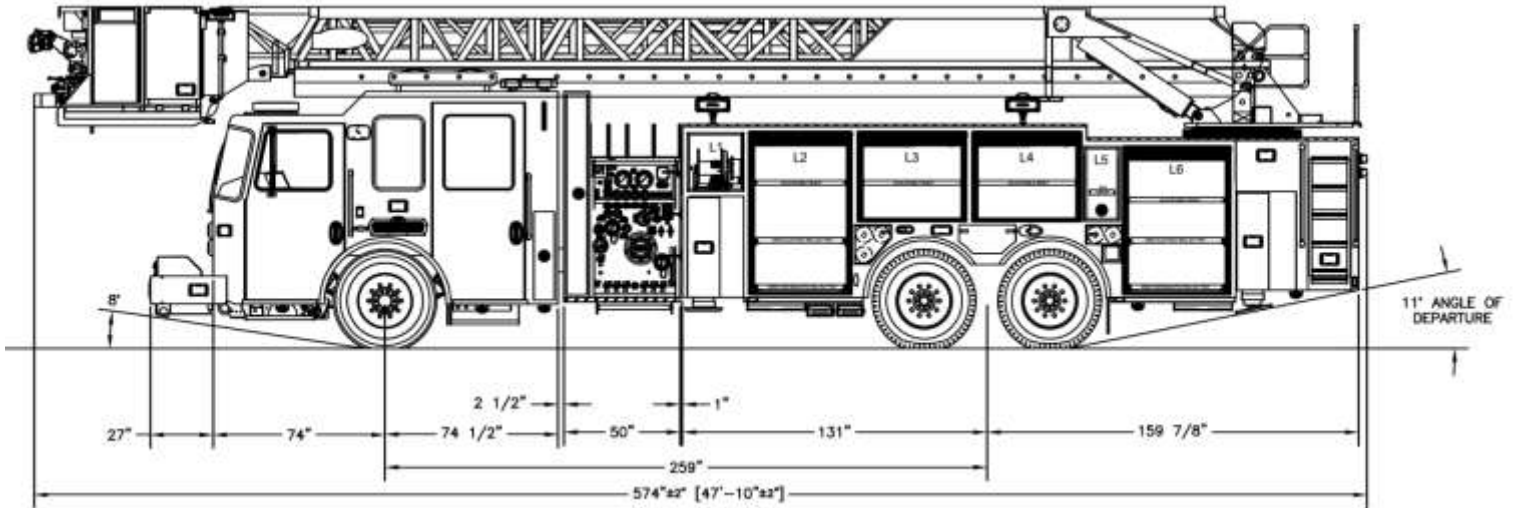


**IF YOUR UNIT HAS AN AIR-RIDE SUSPENSION, DO NOT PULL OUT IMMEDIATELY AFTER THE FIRE FIGHTING MISSION. EVERYTIME THE OUTRIGGERS ARE DEPLOYED AND STOWED, ENSURE THAT THE AIR PRESSURE IS BUILT UP BEFORE MOVING THE UNIT. INSUFFICIENT AIR IN THE SUSPENSION SYSTEM CAN CAUSE EQUIPMENT DAMAGE OR FAILURE.**

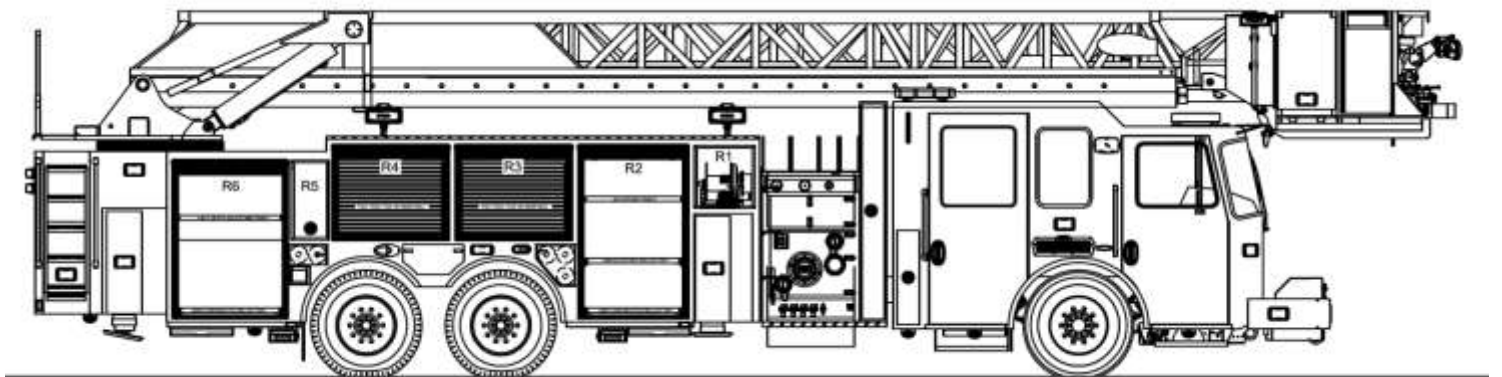
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SECTION 1 - AERIAL VIEWS

DRIVER SIDE VIEW



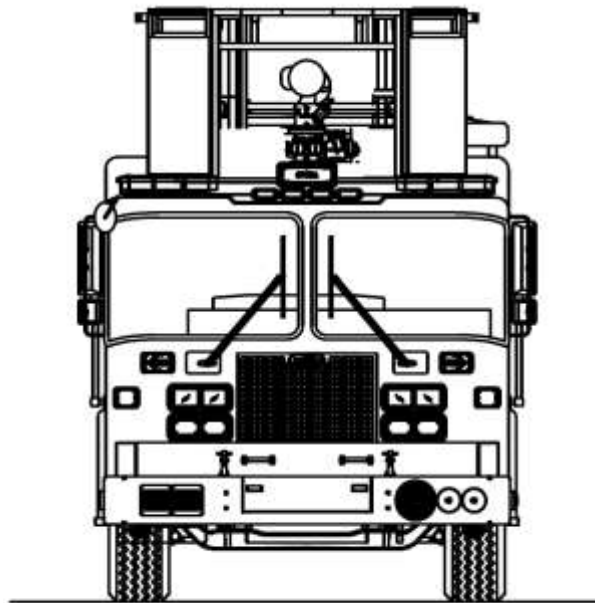
OFFICER SIDE VIEW



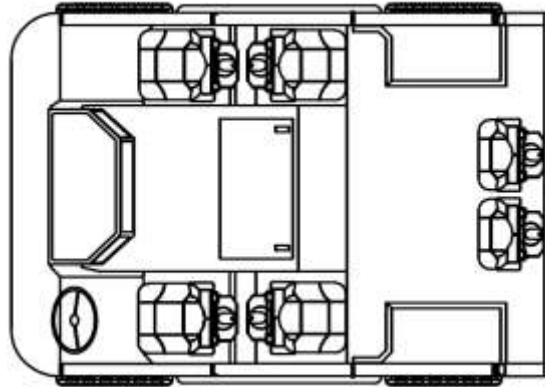
**TOP VIEW**



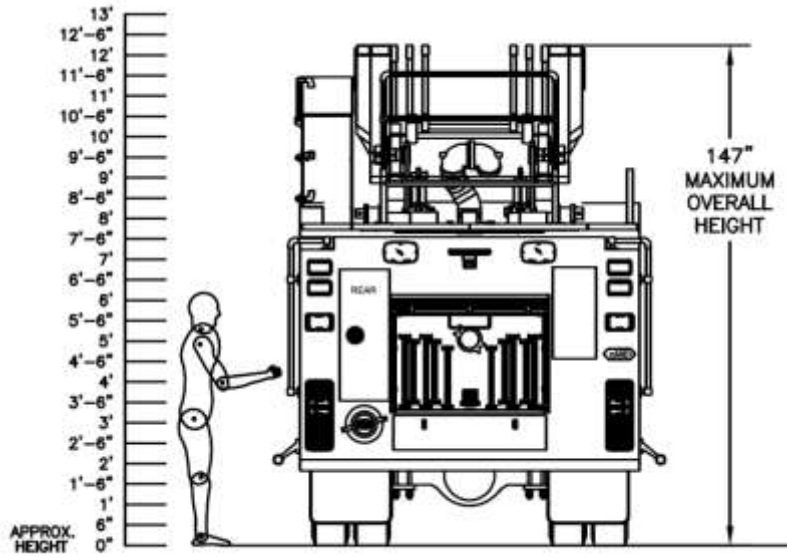
**FRONT VIEW**



**CAB INTERIOR**



**REAR VIEW**



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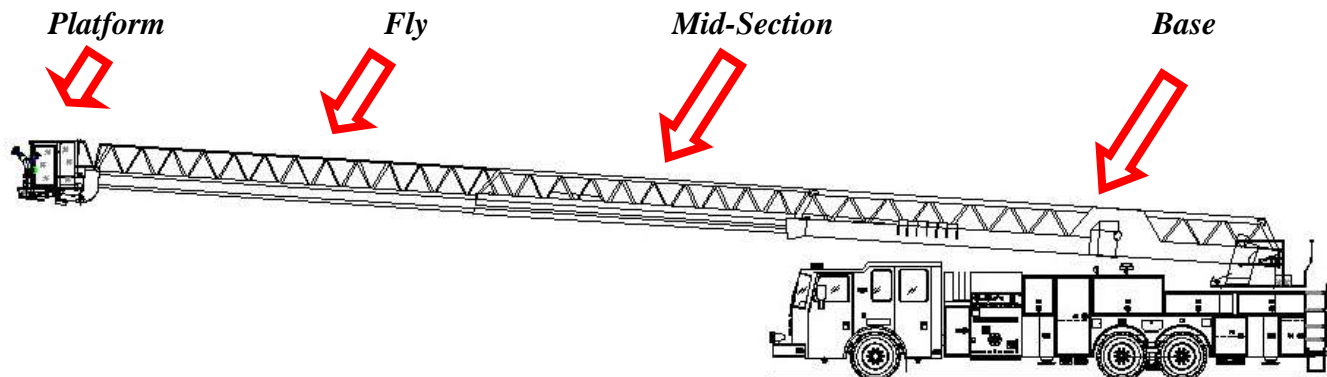
## Aerial Device General Descriptions

*This section provides general descriptions of the components and systems used on the 102' Platform Aerial.*

The KME 102' Platform Aerial ladder has been designed to the National Fire Protection Association standards for structural safety, stability and operation. These capabilities have been tested and certified in the unsupported configuration. The components and systems of the Aerial are briefly described in the following paragraphs.

### CONSTRUCTION

The KME Aerialcat 102' aerial ladder consists of three (3) ladder sections: the base section, the mid section and the fly section.



All ladder base rail sections are constructed of high tensile strength steel with all stress points reinforced for extra rigidity, thereby yielding excellent strength to weight ratio, The base section side rails are of modular box design for maximum strength and stability. All ladder rungs are welded through the side rails and are securely braced with “K” type braces.

All rungs are round and are spaced 14 inches between centers. The rungs are covered with a deeply serrated, replaceable heavy-duty fiber resin sheath.

To facilitate maximum use of the Aerialcat during fire fighting or rescue operations, the ladder sections and hand rails have been designed with maximum space and height to allow passage of personnel and equipment.



### BASE SECTION

Due to forces created by elevation and rotation, torsional or twisting moment is present in all aerial device designs. The base section shall be constructed utilizing a high strength 100,000 psi steel 6.00" x 3.00" base rail tube with a .5-inch x 4.25-inch steel top plate for load transfer. The handrail shall be constructed utilizing a high strength 100,000 psi steel 5-

inch x 2-inch handrail tube. The two (2) rails shall be welded together with diagonal sections, creating a truss structure which shall support all weight and forces imposed by the mid and fly sections.

**MID FLY SECTION**

The mid section shall be constructed utilizing an ultra-high strength 100,000 psi steel 6-inch x 3-inch base rail tube with a .5-inch x 4.25-inch wide top plate for load transfer. The handrail shall be constructed utilizing an ultra-high strength 100,000 psi steel 4-inch x 2-inch handrail tube. The base rail tube and handrail tubes shall be welded together with diagonal sections, creating a truss structure which shall support all weight and forces imposed by the fly section.



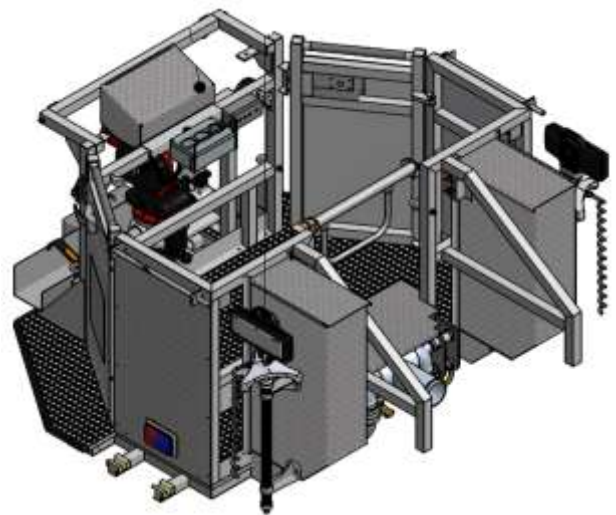
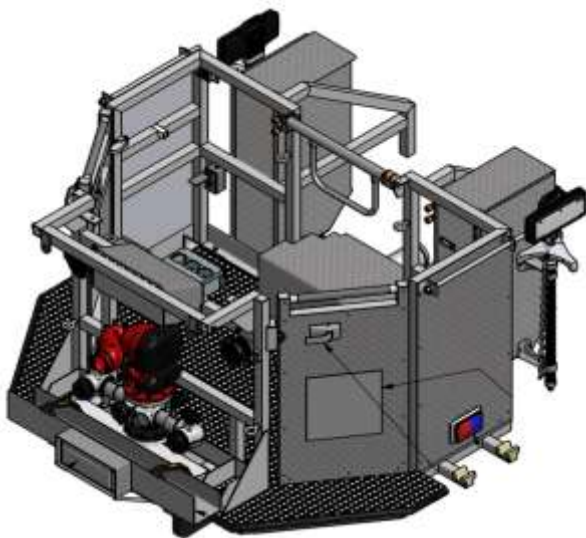
**FLY SECTION**

The fly section shall be constructed utilizing an ultra-high strength 100,000 psi steel 5-inch x 2-inch base rail tube. The handrail shall be constructed utilizing an ultra-high strength 100,000 psi steel 3-inch x 2-inch handrail tube. The base rail tube and handrail tubes shall be welded together with diagonal sections, creating a truss structure which shall support all weight and forces imposed by the tip loads.



The fly section is designed specifically for the purpose of supporting the platform. This support structure is in the form of a solid and integral weldment designed to support the leveling system and platform pivot points. The support is designed to structurally support the platform, platform movements, and loads in aerial operation and in over the road travel.

**PLATFORM**



The aerial platform is designed for modular construction. The handrails, floor and support structure will

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be assembled to enable each component to be unbolted from each other for ease of replacement should a component of the platform be damaged.

The platform will be constructed of five assembly groups:

1. Platform support structure
2. Handrails
3. Corner gates
4. Floor extrusion
5. Rear access gate

The support structure of the platform is a steel weldment consisting of 100,000 psi steel tubing for strength and rigidity. The slave leveling cylinders shall attach to this structure for the ladder fly section, thus keeping the platform level at all times.

**LADDER SECTION DIMENSIONS**

All bidders shall state in the space provided below their dimensions on the unit proposed. Dimensions proposed must equal or exceed those specified.

	<b>Handrail Height</b>	<b>Handrail Width</b>
Base Section	30"	42.5"
Mid Section	26.5"	33.25"
Fly Section	24"	24"

**OVERLAP SURFACES BETWEEN SECTIONS**

Base to Mid Section	105"
Mid to Fly Section	105"

**TRAVEL SUPPORT**

A heavy duty rest shall be provided to support the aerial in the travel position. Stainless steel bedding plates shall be attached to the aerial base section to protect the aerial when the unit is in the travel position.

**TORQUE BOX**

A torque box shall be provided to transfer all aerial loads and torque into the four outriggers, thus preventing the loads from being transferred through the chassis . The torque box shall be constructed of .375" steel plate with the exception of the turntable area which shall be .50" steel plate. The torque box sub frame assembly shall be capable of withstanding all torsional and horizontal loads when the unit is on the stabilizers. An open base shall be designed to accommodate the storage of ground ladders as specified in the body portion of these specifications. The torque box shall be bolted to the chassis frame rails with forty two (42), 3/4" SAE grade 8 bolts and nuts.

This type of construction shall be required for the following reasons:

- Replacement of the chassis in the event of vehicle damage to this chassis.
- Replacement of the chassis due to age.

#### **OUTRIGGER ASSEMBLIES**



Four (4) double box beam type out and down outriggers shall be provided. The side to side spread of the outriggers shall be 18' from centerline of the vertical jack beams. The outrigger system will be capable of leveling the vehicle, fore/aft and side to side.

The horizontal outrigger beam shall be fabricated from 1/2" steel side plates and 1" steel top and bottom plates.

Each outrigger assembly shall have 2 Nylatron slide pads with a total area of 24 sq. in. to provide smooth operation and to extend the life of the outrigger.

The vertical jack cylinder rods shall be fully enclosed by a telescopic inner steel jack box that shall do the following:

Protect the cylinder rods against damage which may occur while on the fire ground.  
Add lateral stability to the outrigger structure.

The extension of the horizontal outrigger beam shall be accomplished by a hydraulic cylinder which shall have a 3" bore and 2" rod and 62" stroke. This cylinder shall have cushion porting to reduce shocks in stopping the cylinder at full extension and retraction.

For ease in maintenance, outrigger extension cylinder shall be equipped with end connections, which do not require removal of body panels to remove pins or the extension cylinders.

Each jack cylinder shall have a 5" bore with a 3-3/4" rod and a 33" stroke. The jack cylinders shall be equipped with integral (on the cylinder) holding valves, which shall hold the jack cylinder in either the stowed position or the deployed position should a hydraulic line be severed at any point within the hydraulic system. Each jack cylinder shall also have a thermal relief system that shall prevent the cylinder fluid pressure from rising due to fluid temperature increase.



#### **JACK CYLINDERS**



The jacking cylinders are fully enclosed by a telescoping inner vertical box to protect the cylinder from damage. Each cylinder is equipped with an automatically stowed or deployed ground foot. The jack cylinders are equipped with integral holding valves located on the cylinder to hold them in place should a hydraulic pressure line be severed at any point in the hydraulic system.

#### **CONTROLS**

Aerialcat operation is controlled at the turntable control station by a system of manually and electrically actuated hydraulic valves.

#### **MAIN CONTROL CONSOLE**

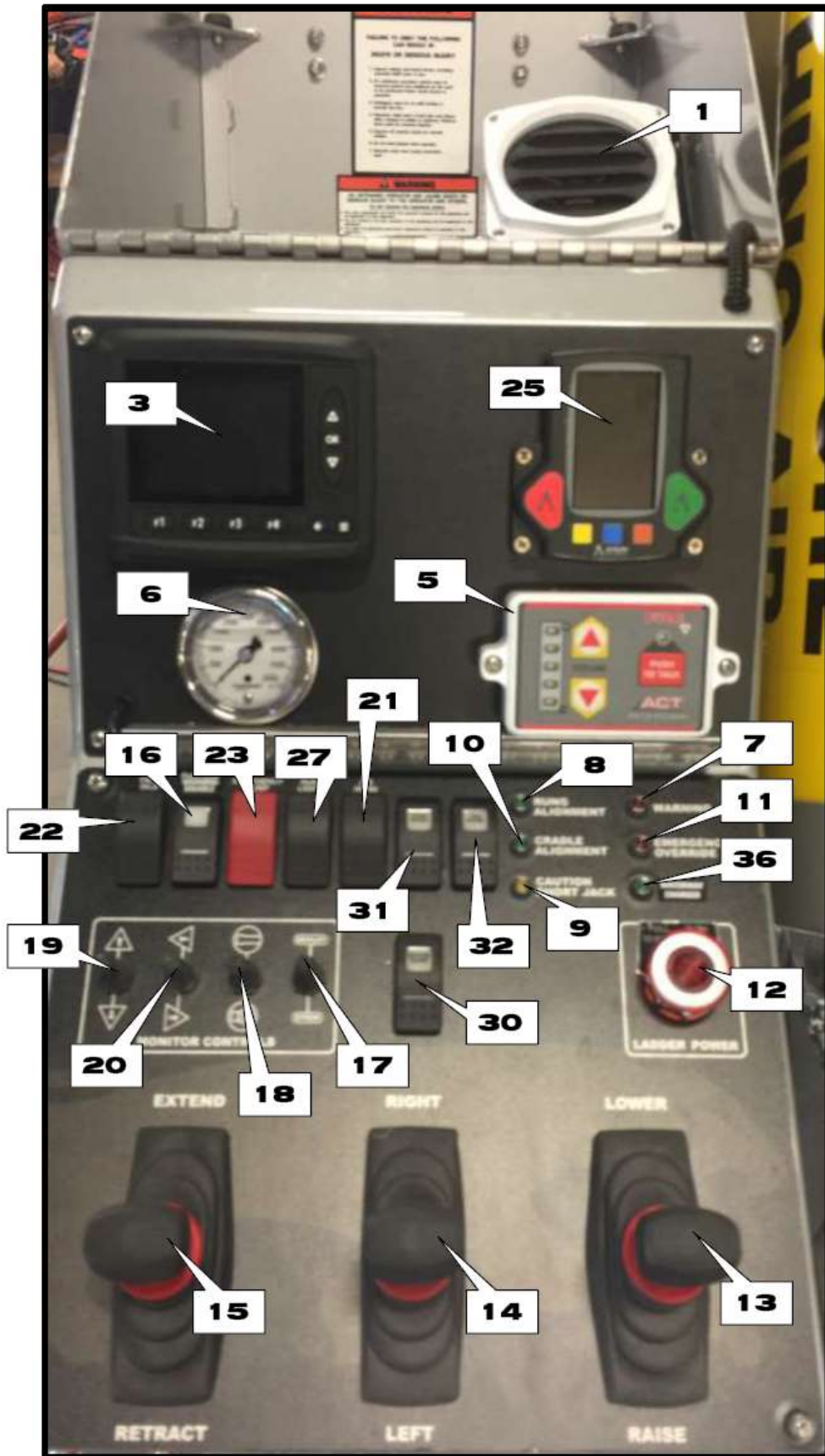
The main control console is illuminated for nighttime operations and is located at the driver's side of the turntable. The following controls and indicators are part of or located near the main control console:

**EXTEND / RETRACT** Control Lever  
**LOWER / RAISE** Control Lever  
**LEFT / RIGHT--ROTATION** Control Lever  
**SWITCHES** for Monitor Controls  
**FAST IDLE** Switch  
**MONITOR NOT STOWED** Indicator Light  
**LADDER POWER** Push/Pull Switch  
**LADDER POWER** Indicator Light  
**HYDRAULIC PRESSURE** Gauge  
**RUNGS ALIGNED** Indicator Light  
**CAUTION SHORT JACK** Indicator Light  
**CRADLE ALIGNED** Indicator Light  
**WARNING** Indicator Light  
**EMERGENCY OVERRIDE** Indicator Light  
**EMERGENCY PUMP** Switch  
**INTERCOM** System  
**AC MASTER SWITCH**



**DIGITAL FLOWMETER**  
**TIP SPOT LIGHT SWITCH**  
**DIGITAL PRESSURE DISPLAY**  
**AIR HORN SWITCH**  
**RUNG LIGHTS SWITCH**  
**FRONT FLOOD LIGHT SWITCH**  
**MASTER DISPLAY MODULE (MD3)**

**NOTE: ABOVE IS AN EXAMPLE OF ITEMS TYPICALLY FOUND ON THE PANEL.**



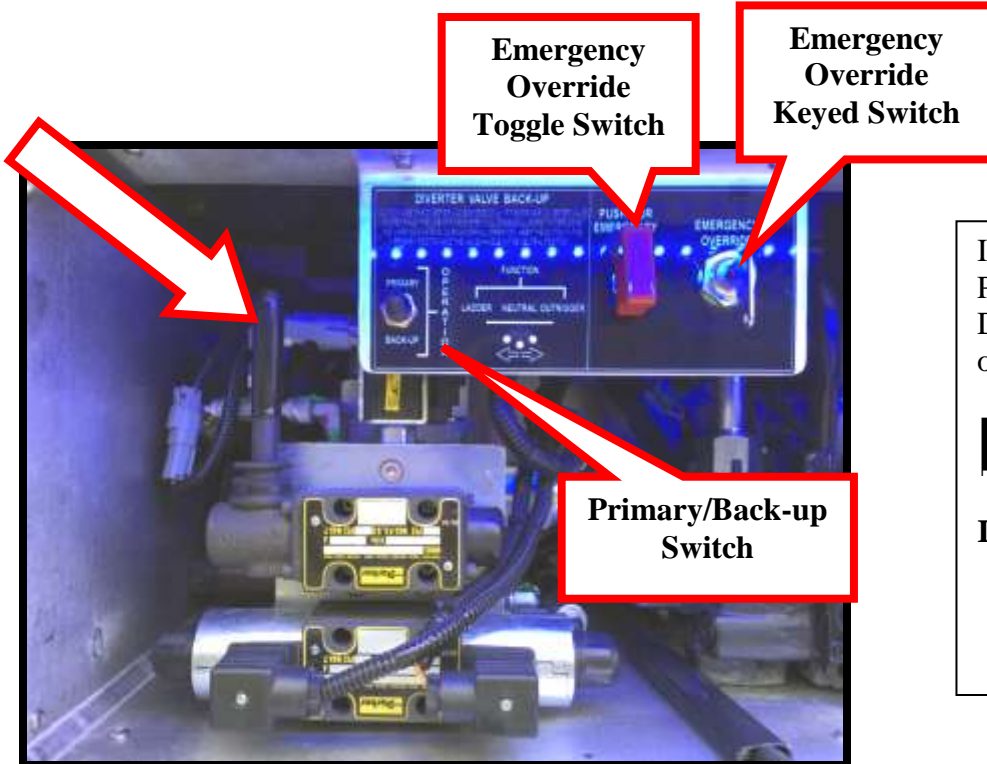
## ILLUSTRATED MAIN CONTROL CONSOLE LEGEND

1. Intercom Speaker	13. Raise/Lower Ladder Control	25. Waterway Valve Control
2. IQan System USB Port	14. Left/Right Ladder Control	26. "Monitor Not Stowed" Indicator
3. Master Display Module (MD3)	15. Retract/Extend Ladder Control	27. Rung Lights Switch
4. Flowmeter	16. Monitor Deployed Indicator	28. Platform Warning Disable
5. Intercom Control Panel	17. Stow/Deploy Control	29. Platform Warning Light Switch
6. Hydraulic Pressure Gauge	18. Nozzle Stream/Fog Control	30. Bottom Flood Switch
7. Warning Indicator	19. Up/Down Monitor Control	31. Front Flood Lights Switch
8. Rung Alignment Indicator	20. Left/Right Monitor Control	32. Telescoping Flood Lights Switch
9. Caution Short Jack Indicator	21. Air Horn Switch	33. Rear Flood Lights Switch
10. Cradle Alignment Indicator	22. Fast Idle Switch	34. Platform Telescoping Lights Switch
11. Emergency Override Indicator	23. Red EPU Switch	35. Cab Rear Scene Lights Switch
12. Ladder Power Switch	24. Aerial Scene Switch	36. Waterway Charged Indicator



A foot operated "DEAD MAN" switch electrically shifts the DIVERTER VALVE to the LADDER position. The "dead man" switch must be depressed before any ladder function can be performed from the main control console.

**EMERGENCY OVERRIDE**

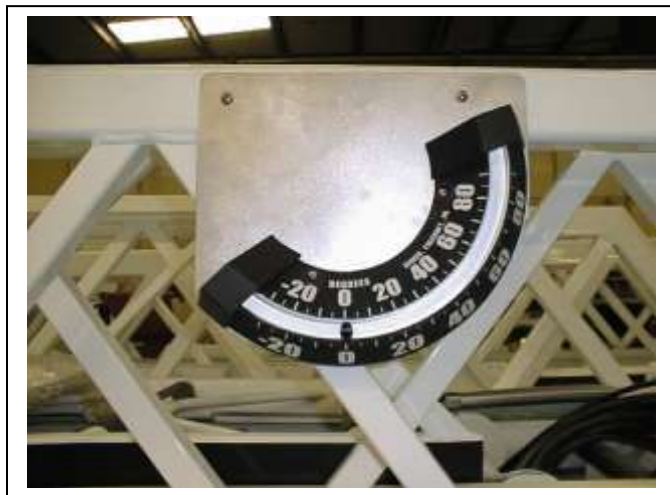


In the event of LADDER POWER failure, the DIVERTER VALVE override must be activated.

**CAUTION**

In over-ride configuration the ladder's electrical safety interlock systems are disabled.

**LADDER ANGLE INDICATOR**



A bubble type angle indicator is mounted on the base section of the ladder and is in easy view of the operator at the main control console. The indicator will show elevation from -7 degrees below horizontal to +80 degrees above horizontal.

## OUTRIGGER CONTROLS

The Aerial Apparatus may be equipped with portable outrigger controls and/or a keypad type control that is located in the rear of the vehicle.

### 1. Portable Outrigger Controls

A portable electronic outrigger control station is provided on the rear of the apparatus. The hand held outrigger control box is weatherproof and oil resistant. The control box has an extension cable and allows the outriggers to be controlled from as far away as 15 feet from the vehicle to allow for clear vision of outrigger movement.

Control functions for each outrigger are operated independently, so that vehicle may be set up in restricted areas or on uneven terrain. The diverter valve override control is mounted at the center rear hydraulic area behind the hinged outrigger control panel along with the override key and EPU actuator switch.

A hinged panel is provided at the rear center of the body. The rear panel is equipped with a stainless steel hinge, which allows the operator to access the diverter valve manual override control, outrigger manual override controls, the electrical system back-up switch, override key switch and EPU controls and hydraulic filter indicator lights.

The portable outrigger control box incorporates the following:

- Trigger must be maintained for all functions
- Two (2) outrigger fully extended indicator lights
- Two (2) outrigger set indicator lights
- Two (2) downrigger set indicator lights
- Two (2) outrigger control toggle switches
- One (1) Fast idle control
- One (1) Ladder Operation indicator light



## 2. Keypad Outrigger Controls

The Keypad Outrigger Controls are found on the driver side and officer side rear, body. The pad has two round switches for Fast Idle and Ladder Power. The top two buttons control the front stabilizer, UP/DOWN, on whatever side control pad you are using. The rear stabilizer has two IN/OUT control buttons and two UP/DOWN control buttons.

NOTE: The photo to the right is the driver side controls.



### OUTRIGGER/LADDER INTERLOCK

An interlock system is provided between the outriggers and ladder that prevents the operation of the ladder until the operator places all jacks in the load supporting configuration. Each outrigger is equipped with a pressure sensitive switch that closes only when the jack is firmly in contact with the ground. Until all jack switches close, electrical power is not transmitted to the turntable (hence preventing ladder operation). A key controlled override switch is provided at the central outrigger control station for emergency override of the interlock system. A green indicator light is provided on the outrigger control panel to indicate the position of the foot pad. Illumination of the indicator light indicates firm ground contact.



**When the override system is used, all electrical safety interlocks are disabled. If the primary diverter valve is functioning properly, the system will automatically switch to outrigger or ladder.**

### ELEVATION SYSTEM

Two (2) double acting lift cylinders are attached between the turntable and the base section near the midpoint of the base section thus creating a better lifting geometry resulting in lower hydraulic operating pressures and improved load distribution on the base ladder section. The cylinders function only to elevate the aerial device and not as a structural member to stabilize the ladder sideways. The lift cylinder rods are attached to the base section with self aligning swivel bearings which prevent side loading on the lift cylinders resulting in longer cylinder seal life. They provide smooth precise elevation from -12 degrees below horizontal to +80 degrees above horizontal. The lift cylinders have a 7-1/2" internal bore, a 4"



diameter rod and 44 1/2" stroke.

The lift cylinders are equipped with integral (on the cylinder) holding valves which prevents the ladder from lowering should a hydraulic line be ruptured at any point within the hydraulic system. They shall also have a manifold line with velocity fuses between the cylinders to prevent uneven cylinder lift. They have both rod and piston hydraulic cushions. These cushions decelerate the cylinder near the end of its stroke creating a smooth stop at full stroke.

#### **ROTATION SYSTEM**

A minimum 50.625" external tooth monorace bearing shall be provided for smooth 360 degree continuous rotation of the aerial device. The upper inside half of the bearing shall be bolted to the turntable base plate with thirty (30) 1" diameter grade 8 bolts. the lower outside half of the bearing shall be bolted to the open base bearing support structure with thirty (30) 1" diameter grade 8 bolts.

Both upper and lower bearing surfaces shall be milled to ensure a true mounting surface for the rotation bearing.

#### **EXTENSION / RETRACTION SYSTEM**



A full hydraulic powered extension and retraction system of the ladder shall be provided through dual hydraulic cylinders and cables, each capable of operating the ladder in the event of failure of one of the systems.

The extension cylinders shall have a 4.5" internal diameter (bore) with 2.5" diameter rod. The extension/retraction cylinders shall be equipped with integral (on the cylinder) holding valves to prevent

the unit from falling should the charge lines be severed at any point within the hydraulic system.

The extension cylinder shall be provided with "hydraulic cushions". The cushions shall serve to decelerate the cylinder near the end of its stroke resulting in a smooth stop at full cylinder stroke. Cables attached to the base and mid ladder section shall be routed over sheave wheels on the base section and cylinder rod. This cabling arrangement shall act as a stroke multiplier to provide full-power ladder extension and retraction.

The extension/retraction cables shall have a minimum safety factor of 5:1 and shall be of the following diameters: Base/Mid Section: 5/8" and Mid/Fly Section 1/2". In order to minimize the obstruction to the ladder climbing area, the extension and retraction sheave wheel assemblies and cables shall be located between the aerial ladder section handrails

#### **HYDRAULIC SYSTEM**

Steel tubing and high pressure hydraulic hoses are used throughout the hydraulic system. Easily accessible strainers and filters are installed in the system to maintain fluid cleanliness. A 43-gallon capacity hydraulic oil reservoir, complete with oil level indicator, provides a sufficient supply of hydraulic oil for the systems operations. Other components that makeup the hydraulic system are the power-take-off hydraulic pump, emergency hydraulic pumps, and hydraulic swivel.

**POWER TAKE OFF HYDRAULIC PUMP**

The power-take-off driven hydraulic pump is equipped with an electric shift power-take-off that drives the main hydraulic pump. The hydraulic pump provides sufficient pressurized hydraulic fluid to meet all the operational requirements of the Aerialcat ladder.

**EMERGENCY PUMPS**

The Aerialcat is equipped with an emergency hydraulic system capable of providing limited ladder operation in the event the main hydraulic pump or vehicle engine fails. The pump is powered by 12VDC integral electric motor; and operates separately from the main hydraulic pump. This pump has an operation time of seven minutes after which they must cool for 1-1/2 hours.

It is, therefore, important that during emergency operations these pumps be used sparingly and only when necessary ladder movements are required.

**ELECTRIC/HYDRAULIC SWIVEL**

The Aerialcat is equipped with a hydraulic/electric swivel that connects the hydraulic lines from the hydraulic pump and reservoir to the main control console on the ladder turntable. The electrical part of the swivel connects all necessary electrical circuits with the ladder turntable. A total of thirty-two (32) collector rings are provided and transfer twelve volt DC (12VDC), 120 volts AC (120VAC) and control signals from the truck to the turntable.

The figure below is only an example of locations where outrigger controls, light switches and rear plumbing and controls could be installed on your unit.



**WATER SYSTEM**

1 The aerial waterway system shall be capable of being supplied by both a mid-ship mounted pump (if required) and an external water source with the inlet on the rear of the apparatus.

The piping from the aerial discharge valve and the rear inlet to the turntable swivel shall be 5" stainless steel pipe. A 5" tee shall join the pump discharge line and the rear inlet line. A 5" water swivel shall be located in the riser pipe from the tee permitting 360 degree continuous rotation of the ladder.

**AERIAL MONITOR & NOZZLE**

An Akron model #3480 "StreamMaster" electrically controlled monitor, equipped with an Akron model #5177 "Akronmatic" electrically controlled master stream nozzle is installed on the outer end of the telescoping aerial waterway. The monitor relay box is located at the tip of the aerial, adjacent to the monitor, and is easily accessible for service.



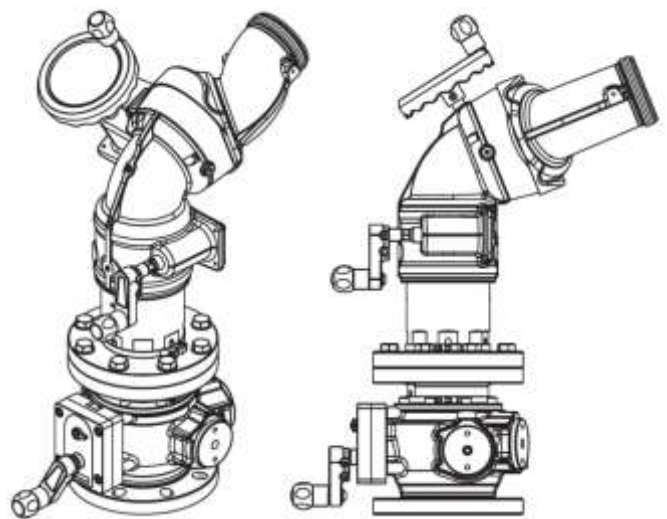
Shown with optional handwheel overrides



The monitor and nozzle functions are controlled from the tip of the fly section and from each of the aerial control consoles. The monitor and nozzle controls consist of three (3) individual spring-loaded, self-centering, weather resistant toggle switches. The monitor and nozzle control functions are as follows:

The monitor has a vertical sweep of 45 degrees below and 120 degrees above, and a horizontal sweep of 180 degrees (90 degrees to each side of the aerial center line). The nozzle allows change from straight stream to fog pattern.

To flow water through the monitor, the valve must be opened using the handwheel at the base of the monitor. To open the valve, turn the handwheel or crank handle until the pointer indicates, "OPEN". To close the valve, turn the handwheel or crank handle the opposite way until the pointer indicates, "CLOSED".



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*This section provides general set up and operating procedures for the 102' Aerialcat Platform.*

All Aerialcat ladder and outrigger operations are precisely controlled through a system of electrically and mechanically actuated hydraulic valves. These controls are located on 3 (3) or four (4) consoles:

1. A ladder control is located on the turntable base.
2. Two outrigger control stations are located at the right rear and left rear of the aerial body and/or one remote outrigger control is located at the right rear of the Aerial Body.
3. A ladder console located in the platform.

If all safety precautions are observed and good judgment is used, the following operating procedures will create a safe and efficient working environment for all aerial ladder personnel and equipment.

#### **AERIAL USAGE**

The Aerialcat load capabilities (refer to the chart in the back of this manual.) have been determined in the unsupported configuration, with the ladder length as indicated, water system not charged, continuous duty and 360 degree operation. The placement of personnel on the ladder shall be centered to the maximum degree possible at all times.

#### **SET-UP PROCEDURES**

All Aerialcat operations can be performed in many different situations and truck placements due to the Aerialcat's mobility, stability, and versatility. For all Aerialcat operations perform the following set-up procedures:

- Position Aerialcat in the best possible location.

#### **POSITIONING THE UNIT**

The KME aerial can be positioned uphill or downhill. Each positioning has advantages and disadvantages. In either position, the aerial must be capable of operating within safe operating limits. Be aware that positioning at the corner of a building gives access to two sides of the structure and the roof.

- Are water tower operations required or are only rescue operations required?
- Investigate and take notice of ALL overhead obstructions, electrical wires, etc.
- Position truck for best access and attack.

#### **POSITIONING UPHILL**

##### **Advantages**

- Extending the rear outrigger jacks will raise the rear of the apparatus, reducing the grade.
- In the setup position the front tires will be in contact with the ground.
- Raising the rear axle off the ground adds to the trucks ballast.

- The rear tires could be left on the ground if no grade correction is required. Leaving the rear tires on the ground offers more resistance to sliding.

**Disadvantages**

- The truck has less resistance to sliding if the apparatus rear tires are off the ground.
- Compartment cargo is more difficult to access due to being higher off the ground.
- Reaching the ground with the tip of the ladder is difficult off the rear of the truck.

**POSITIONING DOWNHILL**

**Advantages**

- Cargo in compartments is easily accessed.
- All tires are in contact with the ground offering the greatest resistance to sliding.
- Reaching the ground with the tip of the ladder is easier off the rear of the apparatus.

**Disadvantages**

- Difficult to extend jacks to reduce grade without raising the front tires off the ground.
- Aerial operation over the front of the apparatus could cause a tethering effect with the front tires off the ground.
- Ballast on the rear is reduced when the rear tires are in contact with the ground.

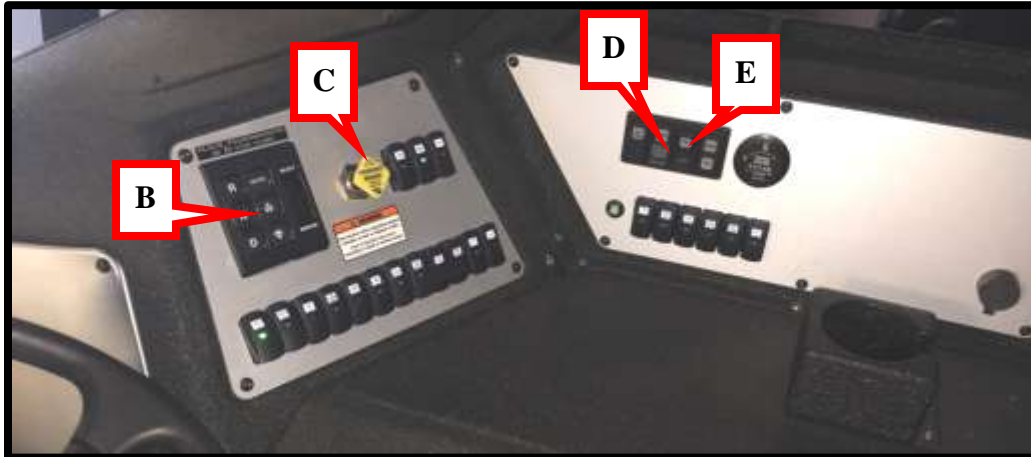
**SET-UP PROCEDURES**



All Aerialcat operations can be performed in many different situations and truck placements due to the Aerialcat's mobility, stability, and versatility.

For all Aerialcat operations perform the following set up procedures:

- A. Position Aerialcat in best possible location.
- B. Shift road transmission to NEUTRAL



C. Pull PARKING BRAKE to set brakes

D. Engage LADDER POWER switch.

E. Engage AERIAL PTO switch.

F. Proceed to Outrigger control station

#### **OUTRIGGER SYSTEM OPERATION**

##### **1. Using a Tether Control**

(If there is no Tether Control, then Go to heading, 2. Using Keypad Control)

Two (2) double box beam "H" type out and down outriggers are located behind the rear wheels to provide vehicle stability during aerial tower operation. The rear outrigger is equipped with a 14' jack spread. Each outrigger assembly has 2 Nylatron slide pads with a total square area of 24 sq. in. to provide smooth operation and to extend the life of the outrigger.



Two (2) additional downrigger's are provided to the rear of the cab to minimize the loads on the front axle and front suspension when the aerial device is in operation over the front of the vehicle. The front downriggers also serve as a fore to aft leveling device when the apparatus is set-up on an incline.

The vertical jack cylinder rods are fully enclosed by a telescopic inner steel jack box that:

- Protects the cylinder rods against damage which may occur while on the fire ground.
- Adds lateral stability to the outrigger structure.

The extension of the rear horizontal outrigger beam is accomplished by a hydraulic cylinder which has a 3" bore and 2" rod and 38" stroke. This cylinder has cushion porting to reduce shocks in stopping the

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**102' Rear-Mount Aerial**



cylinder at full extension and retraction.

Each jack cylinder has a 5" bore with a 3-3/4" rod and a 24" stroke, and are equipped with integral (on the cylinder) holding valves, which holds the jack cylinder in either the stowed position or the deployed position should a hydraulic line be severed at any point within the hydraulic system. Each jack cylinder also has a thermal relief system that prevents the cylinder fluid pressure from rising due to fluid temperature increase.

All outrigger operations are controlled from the tethered outrigger hand held control located at the rear of the truck

Switch "ON" the controller by pushing the switch towards the "ON" position. Momentary switch will return to "RUN" position..

On outrigger control panel, engage FAST IDLE (Push momentary switch to UP).



"DEADMAN" trigger must be depressed for all outrigger functions.

**NOTE**

**NOTE: RELEASING THE TRIGGER SWITH WILL CAUSE ALL FUNCTIONS TO STOP IMMEDIATELY**



Fast Idle speed should not exceed factory pre-set level or damage to the hydraulic pump may occur.



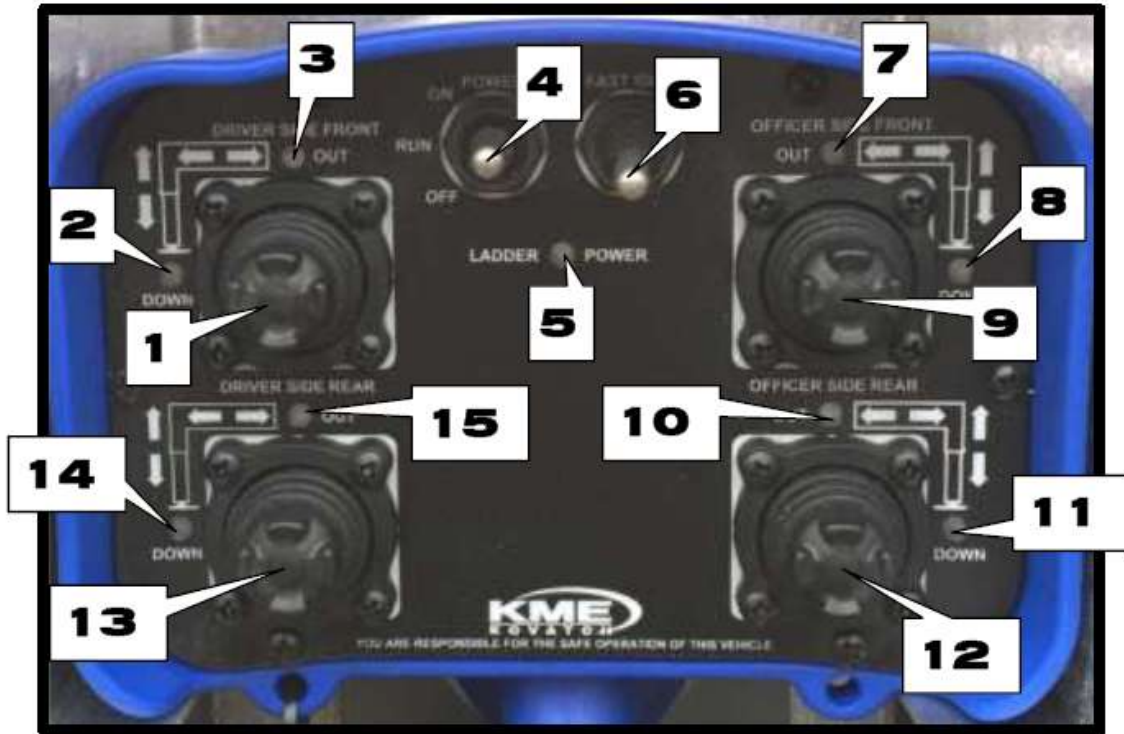
When operating over the side of the Aerialcat truck, the outriggers for that side **MUST** be fully extended.

**NOTE**



**If outriggers on one side cannot be fully extended then operations from that side shall not be permitted.**

**ILLUSTRATED TETHER CONTROL**



<b>TETHER CONTROLLED OUTRIGGERS</b>	
1. Front Driver Side 4-Directional Switch	9. Front Officer Side 4-Directional Switch
2. Front Driver Side Outrigger Down Indicator	10. Rear Officer Side Outrigger Out Indicator
3. Front Driver Side Outrigger Out Indicator	11. Rear Officer Side Outrigger Down Indicator
4. Power Toggle Switch –ON/RUN/OFF	12. Rear Officer Side 4-Directional Switch
5. Ladder Power Indicator	13. Rear Driver Side 4-Directional Switch
6. Fast Idle Toggle Switch	14. Rear Driver Side Outrigger Down Indicator
7. Officer Side Front Outrigger Out Indicator	15. Rear Driver Side Outrigger Out Indicator
8. Officer Side Front Outrigger Down Indicator	

**MANUAL OUTRIGGER LEVELING SYSTEM**

A. Using the controller depress the “DEADMAN” switch on the controller handle with the index finger push the “JOYSTICK” for each outrigger towards the EXTEND position and extend outriggers maximum extension possible.

 **CAUTION** 

**Both the jacks and the outrigger could move at the same time. Care should be used when extending the outrigger beams in manual mode.**

B. Place outrigger ground pads directly under outriggers to assure proper footing.

**NOTE:** Correct placement of the ground pad with the pad handle inside and away from foot traffic. Placing handle inside and under outrigger will prevent personnel from tripping.



C. Using the controller depress the “DEADMAN” switch on the controller handle with the index finger push the “JOYSTICK” for each outrigger towards the DOWN position and extend the jacks until the truck is at the desired height. (Tires should stay in contact with ground).

D. Level Aerialcat, Proceed as follows:

1. Raise low point with appropriate jack cylinder (set joystick to DOWN) to slightly above horizontal or full extension.



**IMPORTANT**

**If horizontal is not achieved perform step (2)**

2. Adjust opposite side jack cylinder to level chassis of Aerialcat as close to level as ground grade will permit.

E. On hand held outrigger control panel ensure that four (4) green **DOWN** indicator lights are on. **If four green DOWN lights are not obtained setup cannot be completed without overriding the safety interlock system.**



**You are responsible to ensure that outriggers are "firm to ground" and all set-up procedures have been properly accomplished.**

Hold "DEADMAN" trigger and extend all outriggers to desired extension with the outrigger joysticks. (Be sure the area around the outriggers is clear of personnel and/or obstructions.)

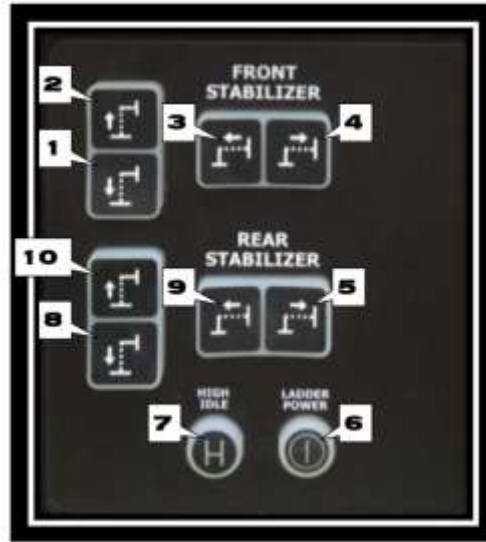
1. Place the outrigger auxiliary footpads



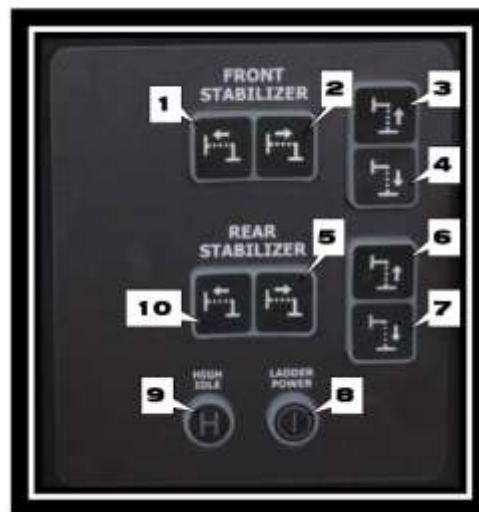
2. When the outriggers are out and down the "LADDER POWER" indicator light shall illuminate.



**2. Using a Keypad Control**  
**ILLUSTRATED KEYPAD CONTROL**

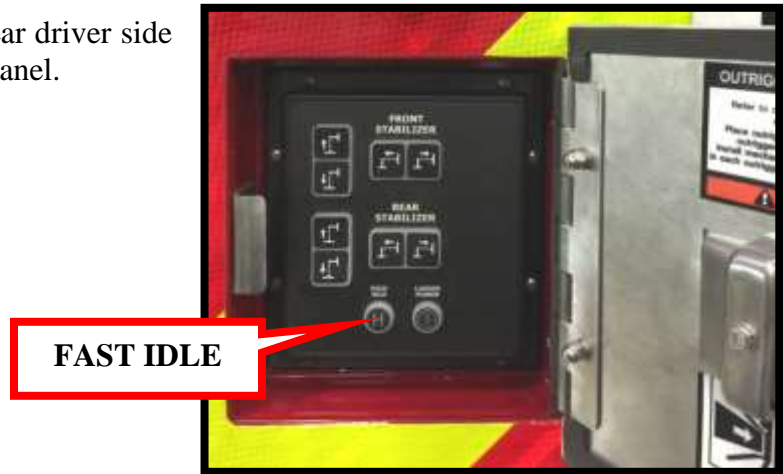


DRIVER SIDE OUTRIGGER/STABILIZER CONTROL PANEL	
1. Front Stabilizer—Down Direction	6. Ladder Power
2. Front Stabilizer—Up Direction	7. High Idle Button
3. Front Stabilizer—Out Direction	8. Rear Stabilizer –Down Direction
4. Front Stabilizer—In Direction	9. Rear Stabilizer—Out Direction
5. Rear Stabilizer—In Direction	10. Rear Stabilizer—Up Direction



OFFICER SIDE OUTRIGGER/STABILIZER CONTROL PANEL	
1. Front Stabilizer—In Direction	6. Rear Stabilizer—Up Direction
2. Front Stabilizer—Out Direction	7. Rear Stabilizer –Down Direction
3. Front Stabilizer—Up Direction	8. Ladder Power Light
4. Front Stabilizer—Down Direction	9. High Idle Button/Light
5. Rear Stabilizer—Out Direction	10. Rear Stabilizer—In Direction

- A. Engage the FAST IDLE on the rear driver side or **officer** side outrigger control panel.



**IMPORTANT**

Fast Idle speed should not exceed factory pre-set level or damage to the hydraulic pump may occur.



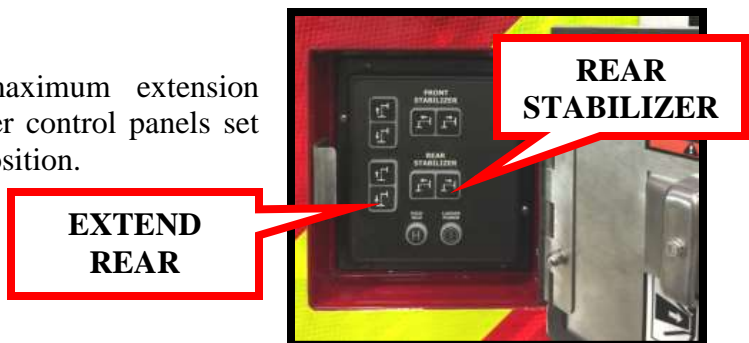
When operating over the side of the Aerial-cat truck, the outriggers for that side shall be fully extended. **If outriggers on one side cannot be fully extended then operations from that side shall not be performed.**

**IMPORTANT**

Both outriggers can be extended simultaneously but a look out on each outrigger control panel is recommended.

**NOTE: REPEAT THESE INSTRUCTIONS ON BOTH SIDES OF THE AERIAL.**

- B. Extend rear outriggers to the maximum extension possible. On left and right outrigger control panels set stabilizer control switches to OUT position.





C. Place outrigger ground pads directly under outriggers to assure proper footing. Ensure the pad handle is under the outrigger beam. This is to avoid a trip hazard.

D. Lower jack cylinders until wheels are at desired height (Tires should stay in contact with ground).

E. Lower front downriggers to about six inches from the ground.

F. Place downrigger ground pads directly under downrigger to assure proper footing. Ensure the pad handle is under truck. This is to avoid a trip hazard.

G. Lower front downriggers to the ground. Do not lift truck off of its wheels.

H. "LADDER POWER" indicator light should illuminate indicating proper jack penetration. Diverter valve is automatically shifted for LADDER operation.



I. **Level Aerial-Cat**, Proceed as follows:

1. Raise low point with appropriate jack cylinder (set switch to DOWN) to slightly above horizontal or full extension.

**IMPORTANT**

**If horizontal is not achieved perform step (2)**

2. Adjust opposite side jack cylinder to level chassis of Aerial-cat as close to level as ground grade will permit.



**You are responsible to ensure that outriggers are "firm to ground" and all set-up procedures have been properly accomplished.**

J. Deactivate the Fast Idle system by depressing the momentary switch.

#### **WATER TOWER OPERATION**

It is important when the water system is charged that the following cautions are enforced:

- A. Turn all valves and nozzles on and off slowly.
- B. Make all ladder and nozzle movements slowly.
- C. Never extend or retract ladder with all valves and nozzles closed.
- D. Restrict ladder retraction.
- E. Familiarize yourself with water tower and activities before charging system.



**Never allow ice deposit layers to increase to ¼ (one quarter) inch**

- F. Beware of ice deposits which reduce capabilities (refer to Load Chart)
- G. Never extend or retract ladder with water pipe frozen.

#### **LADDER OPERATION**

##### **General**



**THE OPERATOR OF THE DEVICE IS RESPONSIBLE FOR KNOWING THE OPERATING CONDITIONS OF THE AERIAL. BEFORE BEGINNING OPERATIONS A VISUAL SCAN OF THE SETUP SHOULD BE PERFORMED TO MAKE SURE THE DEVICE IS SET UP PROPERLY FOR THE OPERATIONS TO BE PERFORMED**

The following are some basic operating rules that shall be followed during the Aerialcat ladder operations.

- Be sure safety chains are hooked across the turntable openings
- The ladder shall be raised to clear the ladder support before any other movement can be obtained.

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*102' Rear-Mount Aerial*



**When starting or stopping any ladder movement (elevation, rotation, or extend/retract) always move controls slowly.**



**Never extend or retract while ladder sections are occupied.**

- Station an operator at the main control console **at all times**. The operator shall be alert and aware of ladder movement and be ready to activate the ladder back-up systems, if needed.
- Never permit the ladder to be lowered against any structure. Damage could result to the ladder sections and water system.
- Ensure that all personnel associated with the Aerialcat are familiar with the normal operations, emergency operations and safety procedures contained in this manual.
- Back up personnel should be available when Aerialcat is operational.
- If any unusual motion of the ladder sections is noted, stop movements until problem is defined and corrected.



**FOR THE SIDE SLOPE ONLY**

- If turntable can be leveled to within 6% of grade (6 feet rise per 100 feet distance) (3.4 degrees) or lower operational capacity limits in Operational Capacity Chart will apply.
- If turntable can be leveled between 6 and 14% of grade (6 to 14 feet of rise per 100 feet distance) (3.5 to 8 degrees) all loads (weights) in Operational Capacity Chart shall be reduced to half.
- **Over 14% grade (8 degrees) operations shall not be attempted.**
- **NO RESTRICTIONS FORE AND AFT.**



**TURNTABLE MAIN CONTROL PANEL**



The following procedures are for operating the Aerialcat from the main control console during normal operations. Before operating controls:

- A. Pull **LADDER POWER** Switch
- B. Ensure **LADDER POWER** indicator is on, and all personnel are clear of ladder area
- C. Foot operated “deadman” switch shall be actuated for all ladder functions from the main control console
- D. Hydraulic Pressure gauge will indicate operating pressure of each function performed.

**RAISE/LOWER FUNCTION**

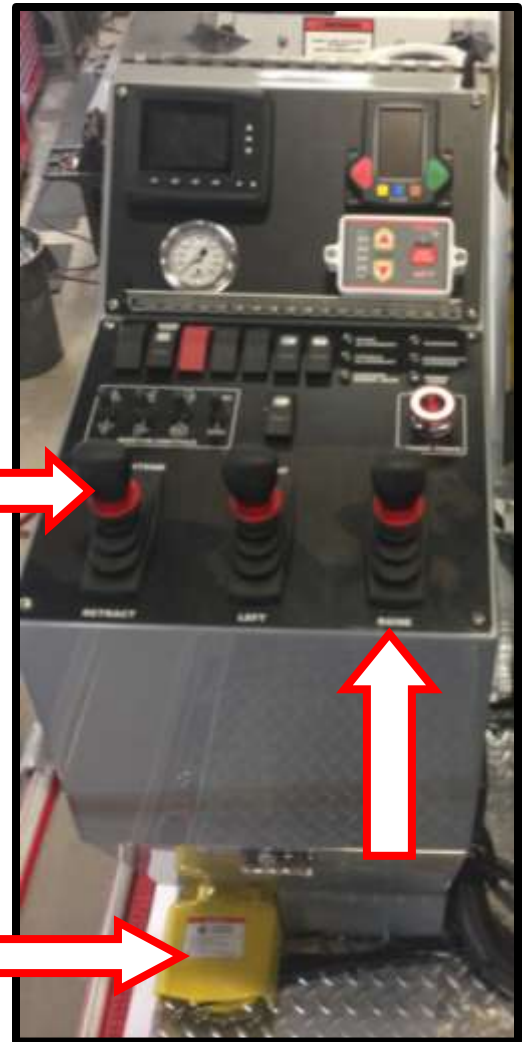
Proceed as follows:

- A. To raise ladder, **SLOWLY** move raise / lower lever toward **RAISE**. When desired angle is obtained **SLOWLY** return lever to center.

**NOTE: BE SURE LADDER IS RAISED TO CLEAR THE CRADLE EARS BEFORE PERFORMING ANY OTHER MOVEMENT**

- B. To lower ladder, **SLOWLY** move raise / lower lever toward **LOWER**. When desired angle is obtained **SLOWLY** return lever to center.

**IMPORTANT**



Angle of elevation can be observed on inclinometer mounted on ladder base section.

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102' Rear-Mount Aerial



## **EXTEND/RETRACT FUNCTION**

Proceed as follows:

- A. To extend ladder, **SLOWLY** move extend/retract lever towards **EXTEND**. When ladder is extended to desired length **SLOWLY** move control to center.
- B. To retract ladder **SLOWLY** move lever toward **RETRACT**. When desired length is obtained, **SLOWLY** move lever to the center.
- C. Observe **RUNG ALIGN** (blue/green) indicator is on, if not extend or retract ladder until lamp comes on showing ladder rungs are aligned.

**If water system is charged when extending or retracting ladder, be sure turret and/or main line control valve are open. Move SLOWLY AND WITH CARE under this condition.**

## **ROTATION FUNCTION**

Proceed as follows:

- A. To turn ladder to left, **SLOWLY** move **ROTATION** lever towards **LEFT** until desired position is obtained then **SLOWLY** return left/right lever to center.
- B. To turn ladder to right, move lever **SLOWLY** towards **RIGHT** in same manner as left.

## **ROTATION SAFETY SYSTEM**

The Rotation Safety System incorporated into this apparatus has been designed to aid the aerial device operator who has primary operational responsibility in preventing the rotation of the aerial device into an over turning mode. This system senses outrigger and outrigger jack positioning in conjunction with the aerial device movement.

If the aerial device operator attempts to move the aerial device off vehicle center, and the outriggers are not fully extended on the direction of the rotation side, and all jacks in firm ground contact, the Rotation Safety System senses this fault and audibly and visually warns the operator to return the aerial device to the center line position.

If the operator fails to return the aerial device to the centerline position the aerial device rotation will stop.



**Should a command decision be made by the officer in charge to utilize the aerial device without the outriggers fully extended and jacks in place (short jacked), a series of manual override procedures can be instituted, which requires two (2) persons to fully override the Rotation Safety System.**



**If this system is overridden, the Fire Department assumes all responsibility for aerial safety and operation.**

### **IQAN-MD3 DISPLAY (Optional)**

The IQAN-MD3 works as the central unit, together with expansion units –XP and –XS, in an IQAN control system. The MD3 works both as a master and a display unit. With the three function buttons, a decrease/increase value-button and an escape button, it is easy to adjust, calibrate and measure the IQAN system. In case of an error the display will alert the operator with a signal and a message on the display.

The MD3 has a back-lit graphic LCD. When the display is energized, the date and time are shown in the character window along with the application description and version. This is called the operational position. This information is normally shown when the aerial device is in normal operation mode. Operational information is provided in the IQAN instruction section.



### **STOWING LADDER**

Before stowing ladder be sure that the required movement will clear all obstruction. Ensure water system is drained.

- A. Retract ladder fully.
- B. Rotate ladder until it is over travel support, **CRADLE ALIGN** indicator is illuminated, and visual inspection is made.
- C. Slowly lower ladder until base section rests on travel support. Power ladder into cradle until cradle lowering valve activates. Then, take foot off of deadman switch the cradle valve will set pressure
- D. If diverter valve override has been used, position lever in outrigger position. If not used, no action is required.
- E. On outrigger control panel or tether, set switches UP. When jacks are fully retracted.
- F. Set four (4) outrigger switches to IN until outriggers are fully retracted. Switches will return to center position.
- G. On the outrigger control panel or tether, disengage **FAST IDLE** by pushing switch.
- H. Replace outrigger ground pads to proper storage area for transport.

If diverter valve override has been used, return switch to (primary) operation position and manual level to center position.

- l. In truck cab, disengage PTO switch.

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**102' Rear-Mount Aerial**

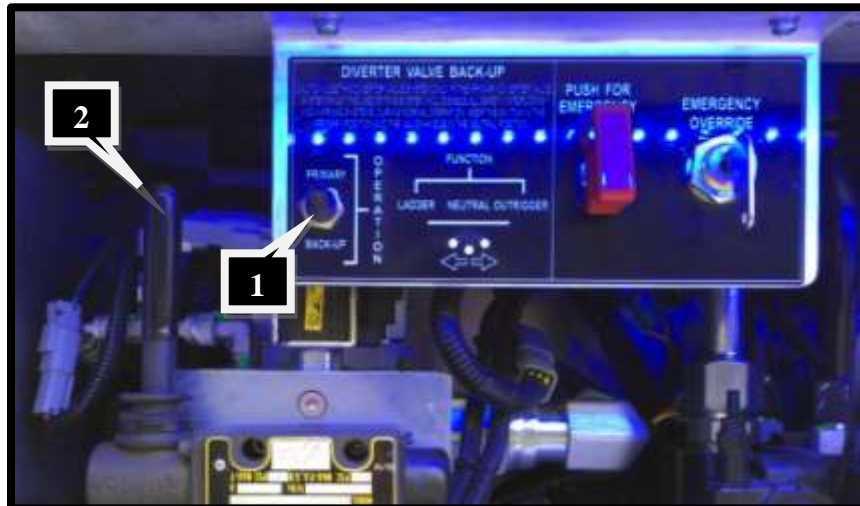
J. Disengage ladder power switch.

### EMERGENCY OPERATIONS

#### Electrical Power Failure

If Main control console is inoperative with loss of electrical power, proceed as follows: (These controls are located in the compartment behind the outrigger indicator panel at the rear of the apparatus).

1. Switch diverter valve override switch to back-up position.
2. Move diverter valve override valve handle to ladder (or outrigger depending on desired operation mode).



3. Perform ladder operations from main control console in normal manner.
4. If electrical power is restored or ladder is stowed and operations completed, return the diverter valve override switch and valve lever to primary (normal) operation mode.

If electrical is lost to the main outrigger control stations, the outriggers can be controlled manually. These controls are located adjacent to the manual diverter valve controls.



**While in “OVERRIDE” Mode, ALL electrical interlocks are disengaged and all control levers are active (ladder and outrigger).**



Electric driven hydraulic pumps are not designed for continuous service. The units on this apparatus will provide sufficient hydraulic flow to operate all systems at a much slower rate. Unless emergency conditions exist the unit should only be used to return the ladder and outriggers to the stowed position.

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*102' Rear-Mount Aerial*

### Hydraulic System Failure

The emergency hydraulic system can be operated from behind the center rear outrigger areas as follows:

**IMPORTANT**

**If the electrical circuit to Ladder Power has failed, the Diverter valve must be manually selected between the Outrigger and Ladder functions.**

- ❑ Disengage PTO switch in truck cab.

### LADDER OPERATION WITH EMERGENCY PUMP

Proceed as follows:

Press and hold **EMERGENCY PUMP** push-button switch on main control console and at the same time move applicable lever—manual lever under control panel to perform ladder function. When movement is complete release

**EMERGENCY PUMP** pushbutton switch.



### OUTRIGGER OPERATION

Proceed as follows:

Place Manual Lever in Outrigger Mode.

Lift SWITCH GUARD and Turn on **EMERGENCY POWER** switch on outrigger control panel and at same time move applicable control to raise jacks or retract outrigger.—Depress end of valve to manually operate outrigger function.

When movement is complete, Turn off **EMERGENCY POWER** switch and place manual valve to center position.

**IMPORTANT**

**Electric driven hydraulic pump are not designed for continuous service. The units on this apparatus will provide sufficient hydraulic flow to operate all systems at a much slower rate. Unless emergency conditions exist the unit should only be used to return the ladder and outriggers to the stowed position.**

### INTERCOM SYSTEM OPERATIONS

The intercom provides communications between the main control console and the platform. All controls are located on the master control station at the turntable main control console.

## INTERCOM OPERATIONS:

1. To adjust MASTER CONTROL for desired talk volume, Turn control clockwise to turn unit on and adjust as required to hear tip operator.
2. To adjust MASTER CONTROL for desired listening level, adjust for desired volume.
3. To talk from master station to remote station, press and hold “PTT” button and speak into the master station. Release “PTT” button to hear operator from remote station.

There is a volume control on the remote station. The remote station is voice activated and requires no user intervention other than adjusting the volume.

## AERIAL SETUP QUICK REFERENCE

**This quick reference is not intended to replace the operator’s manual. Prior to operation of the device you MUST be properly trained in all aerial operation procedures.**

- Position TRUCK
- Shift road transmission to NEUTRAL
- Apply parking brake and front wheel brake
- Engage LADDER POWER and PTO switches.
- Properly set WHEEL CHOCKS in place on FRONT Axle
- At OUTRIGGER CONTROL PANEL engage FAST IDLE
- At OUTRIGGER CONTROL PANEL extend OUTRIGGERS fully
- Position OUTRIGGER GROUND PADS
- Lower OUTRIGGER JACKS until indicator lights illuminate
- LEVEL truck – “AERIAL POWER” indicator light should be illuminated
- Ensure WHEEL CHOCK position
- DISENGAGE HIGH IDLE

PROCEED WITH AERIAL OPERATIONS

### **If PUMPING operations are required after starting AERIAL operations:**

- Momentarily halt aerial movements
- Disengage FAST IDLE
- IN CAB engage pump shift to PUMP position
- Select DRIVE for the ROAD transmission

PROCEED WITH AERIAL OPERATIONS

### **If AERIAL operations are required after starting PUMPING operation (Provided truck was set up on outriggers initially):**

- Reduce ENGINE SPEED with remote throttle if possible. (This is advised but not necessary)
- Engage LADDER POWER and PTO switches in cab

PROCEED WITH PUMPING AND AERIAL OPERATIONS

Perfect safety is not an accident; it happens because operating personnel are aware of hazardous conditions and approach these conditions armed with the knowledge and experience required to react correctly with controlled movements. While safety is the prime responsibility of the operator(s), all personnel who work around the Aerialcat, shall read and thoroughly understand all the safety precautions in this section. With these thoughts in mind, the following list of safety rules shall be thoroughly read and understood before attempting to put the Aerialcat into operation. Remember, failure to follow just one safety precaution can result in injury to personnel and damage to the equipment.

**SAFETY PRECAUTIONS:**

Because of the varied situations in which the Aerialcat will be operated, it is impossible to compile a complete list of safety precautions that will cover all conditions and tasks. Therefore, the following safety precautions have been compiled to aid personnel in utilizing the Aerialcat in a safe and efficient manner. The safety precautions listed in this section are divided into four groups:

- Pre-operational
- Operational
- Personnel
- Traveling

**PRE-OPERATION PRECAUTION**

- Position and set outriggers before attempting any ladder operation.
- Fully extend outriggers before attempting to extend ladder to maximum length.
- Position Aerialcat for over the side operation whenever possible.
- Avoid dangerous banks or areas where uncertain ground support conditions might exist.
- Always position Aerialcat at least 10 feet away from all overhead wiring.
- Keep turntable deck, support rails, and ladder rungs free of grease, mud or any foreign matter.
- Inspect all cables when practical, replace if required.
- Ensure that Aerialcat is in proper adjustment at all times.
- Do not clean, lubricate, or adjust Aerialcat during any ladder operations.

**OPERATIONAL PRECAUTIONS**

- Ensure that operators are familiar with load capabilities of the Aerialcat.
- Avoid exceeding published load limitations at all times.
- Ensure that operators are familiar with location and operation of alternate (back-up) controls.
- Ensure that only qualified operators are operating the control console at all times.
- Use smooth even pressure when operating controls at all times.
- Ensure that the Aerialcat is being watched for obstructions or erratic operation at all times.
- Do not support ladder against any structure at any time.
- Do not use ladder as a crane.
- Do not PULL sideways using the ladder.
- Do not use ladder as a battering ram.
- Do not extend or retract ladder with water system shut-off valve CLOSED.



**THE OPERATOR OF THE DEVICE IS RESPONSIBLE FOR KNOWING THE OPERATING CONDITIONS OF THE AERIAL. BEFORE BEGINNING OPERATIONS A VISUAL SCAN OF THE SETUP SHOULD BE PERFORMED TO MAKE SURE THE DEVICE IS SET UP PROPERLY FOR THE OPERATIONS TO BE PERFORMED**

The following are some basic operating rules that shall be followed during the Aerialcat ladder operations.

- Be sure safety chains are hooked across the turntable openings
- The ladder shall be raised to clear the ladder support before any other movement can be obtained.



**When starting or stopping any ladder movement (elevation, rotation, or extend/retract) always move controls slowly.**



- Never extend or retract while ladder sections are occupied.**
- Station an operator at the main control console at all times. The operator shall be alert and aware of ladder movement and be ready to activate the ladder back-up systems, if needed.
- Never permit the ladder to be lowered against any structure. Damage could result to the ladder sections and water system.
- Ensure that all personnel associated with the Aerialcat are familiar with the normal operations, emergency operations and safety procedures contained in this manual.
- Back up personnel should be available when Aerialcat is operational.
- If any unusual motion of the ladder sections is noted, stop movements until problem is defined and corrected.



Safety precautions are predicated upon proper positioning of support vehicle so that the attitude of the ladder base is very nearly horizontal. If the proper position limit cannot be achieved, extreme care should be taken during operation to prevent, to the greatest degree practical, side loads on the



**ladder due to the tilt of the base in the ladder in any extension condition. Whenever possible the truck should be positioned relative to the terrain slope so that the slope effects can be minimized.**

- Whenever excessive ice deposits begin to accumulate on the Aerialcat during operations, shut down or reduce water discharge and gradually retract and extend the ladder to break off the ice.

**IMPORTANT**

**Never let ice deposits become so excessive that they eliminate rescue capabilities of the Aerialcat.**

- If icing conditions prevail, do not operate the ladder at full extension below 55 degrees elevation. Below 55 degrees elevation, fully retract ladder.

**IMPORTANT**

**Prevailing icing conditions are defined as those conditions which result in an accumulation of not more than ¼ inch of ice on the ladder.**

- Operation in extensive icing conditions is not recommended, however if essential, minimize load on ladder.
- Do not operate the Aerialcat in winds gusting above 50 MPH unless restraining guy wires are used.
- Ensure that the personnel on the ladder are centered to the maximum degree possible at all times.
- Do not abruptly start or stop the Aerialcat in rotation at any time.
- Do not abruptly change angle of elevation of Aerialcat at any time.

**PERSONNEL PRECAUTIONS**

- Ensure the ladder is properly positioned before climbing.



**NFPA-COMPLIANT LADDER BELTS OR OTHER FALL PROTECTION EQUIPMENT MUST BE PROPERLY USED AT ALL TIMES BY ALL PERSONNEL OPERATING ON OR FROM THIS AERIAL LADDER. FAILURE TO EXERCISE PROPER FALL PREVENTION CAN RESULT IN SERIOUS INJURY OR DEATH!**

**WHEN OPERATING ON OR FROM AN AERIAL LADDER, ALL PERSONNEL MUST BE PROPERLY SECURED TO THE AERIAL LADDER WITH A FALL PROTECTION SYSTEM IN COMPLIANCE WITH NFPA 1983, STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES.**



**FAILURE TO EXERCISE PROPER FALL PROTECTION CAN RESULT IN SERIOUS INJURY OR DEATH.**

- Do not abruptly start or stop the Aerialcat in rotation at any time with personnel on the ladder.
- Do not abruptly change angle of elevation of Aerialcat at any time with personnel on ladder.
- Do not extend or retract ladder with personnel on or climbing ladder.
- Ensure that all ladder moves are slow and precise.
- If ladder strikes overhead lines, all personnel shall remain in position until ladder is freed or power source is shut OFF. Keep all ground personnel away from Aerialcat.
- If ladder strikes overhead lines, and personnel are still on the truck and must leave, they should **JUMP** clear of the truck. **They should not simultaneously contact the truck and the ground.**
- Ensure that the ladder retracted and stowed if the operator leaves the control station.
- Do not leave the ladder unattended in the extended position while elevated.

**TRAVELING PRECAUTIONS**

- Always retract and stow ladder before moving truck.
- Ensure ladder is firmly seated in truck support before initiating travel.
- Ensure that outriggers are stowed prior to initiating travel. Post a look out to watch for clearance during travel.
- Ladder power must be turned off before moving truck.

The following tables list the symptoms of some common problems and possible corrective measures. Before calling KME or a KME authorized service center for assistance, eliminate problem causes using the tables. If you cannot correct a problem, please have the following information ready prior to calling the KME authorized representative for assistance.

- ❑ Truck Model and GSO Number
- ❑ Aerial Device type and Fire Department Name
- ❑ Observed Symptoms and Under What Conditions the Symptoms Occur

### CONTROL VALVE TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	CHECKOUT PROCEDURES AND REMEDIAL ACTIONS
<b>STICKING SPOOL</b>	<ol style="list-style-type: none"> <li>1. Excessively high oil temperature.</li> <li>2. Dirt in oil.</li> <li>3. Valves warped from mounting.</li> <li>4. Excessively high pressure in valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Eliminate any restriction in pipe line or filtering system.</li> <li>2. Change oil and flush system.</li> <li>3. Loosen valve and check.</li> <li>4. Check pressure at inlet and at working parts,</li> </ol>
<b>LEAKING SEALS</b>	<ol style="list-style-type: none"> <li>1. Paint on or under seal.</li> <li>2. Excessive back pressure.</li> <li>3. Dirt under seal.</li> <li>4. Scored spool.</li> <li>5. Loose seal plates.</li> <li>6. Cut or scored seal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove and clean as necessary.</li> <li>2. Open or enlarge line to reservoir.</li> <li>3. Remove and clean as necessary.</li> <li>4. Replace valve.</li> <li>5. Clean and tighten plates.</li> <li>6. Replace faulty parts.</li> </ol>
<b>UNABLE TO MOVE SPOOL IN OR OUT</b>	<ol style="list-style-type: none"> <li>1. Dirt in valve.</li> <li>2. Spool cap full of oil</li> <li>3. Binding linkage</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean and flush out valve assembly.</li> <li>2. Replace seals</li> <li>3. Free linkage</li> </ol>
<b>POOR HYDRAULIC SYSTEM PERFORMANCE OR FAILURE</b>	<ol style="list-style-type: none"> <li>1. Defective pump / compensator.</li> <li>2. Dirt in relief valve.</li> <li>3. Relief valve damage.</li> <li>4. Load too heavy.</li> <li>5. Spool not at full stroke.</li> <li>6. Oil low in reservoir.</li> <li>7. System filter clogged.</li> <li>8. Line restricted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check pressure or replace pump.</li> <li>2. Disassemble and clean relief valve.</li> <li>3. Replace relief valve.</li> <li>4. Reduce load (refer to load chart for rated capacities).</li> <li>5. Check movement and linkage.</li> <li>6. Add oil, fill to FULL mark on dipstick.</li> <li>7. Clean or replace filter element.</li> <li>8. Check lines and clean or replace as necessary.</li> </ol>

## Elevation System Troubleshooting

TROUBLE	PROBABLE CAUSE	CHECKOUT PROCEDURES AND REMEDIAL ACTIONS
<b>LADDER RAISES ERRATICALLY</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Low engine RPM.</li> <li>3. Main relief valve damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish hyd. oil to proper level.</li> <li>2. Increase engine RPM to recommended setting.</li> <li>3. Replace relief valve.</li> </ol>
<b>LADDER LOWERS ERRATICALLY</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Low engine RPM.</li> <li>3. Circuit and / or relief valve inoperative.</li> <li>4. Damaged hydraulic pump.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish hydraulic oil to proper level.</li> <li>2. Increase engine RPM to recommended setting.</li> <li>3. Repair or replace relief valve.</li> <li>4. Replace pump.</li> </ol>
<b>LADDER RAISES SLOWLY</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Low engine RPM.</li> <li>3. Damaged relief valve.</li> <li>4. Extremely cold hydraulic oil.</li> <li>5. Operating two functions within the same control valve bank assembly.</li> <li>6. Cylinder piston seals leaking</li> <li>7. Scored cylinder barrel.</li> <li>8. Worn hydraulic pump.</li> <li>9. Cylinder piston seals worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish oil to proper level.</li> <li>2. Increase engine RPM to recommended setting.</li> <li>3. Repair or replace relief valve.</li> <li>4. Operate unit to bring oil to operating temperature.</li> <li>5. Feather controls to obtain desired speed of both functions.</li> <li>6. Replace all cylinder seals.</li> <li>7. Hone or replace barrel.</li> <li>8. Repair or replace pump.</li> <li>9. Replace all cylinder seals.</li> </ol>
<b>LADDER WILL NOT RAISE</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Main relief valve or circuit relief valve damaged.</li> <li>3. Excessive load.</li> <li>4. Worn or damaged hydraulic pump.</li> <li>5. Broken pump shaft.</li> <li>6. Broken control valve spool.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish oil to proper level.</li> <li>2. Repair or replace relief valve.</li> <li>3. Reduce load as required.</li> <li>4. Replace pump.</li> <li>5. Replace pump.</li> <li>6. Replace control valve.</li> </ol>
<b>LADDER WILL NOT LOWER</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Main relief valve or circuit relief valve damaged.</li> <li>3. Improperly adjusted control valve linkage.</li> <li>4. Worn or defective hydraulic pump.</li> <li>5. Broken pump shaft.</li> <li>6. Broken pump drive coupling.</li> <li>7. Broken control valve spool.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish oil to proper level.</li> <li>2. Repair or replace relief valve.</li> <li>3. Adjust linkage to obtain full spool travel.</li> <li>4. Repair or replace pump.</li> <li>5. Replace pump.</li> <li>6. Replace drive coupling.</li> <li>7. Replace control valve.</li> </ol>

## OUTRIGGER TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	CHECKOUT PROCEDURES AND REMEDIAL ACTIONS
<p><b>SLOW OR ERRATIC OPERATION OF OUTRIGGER EXTENSION CYLINDER</b></p>	<ol style="list-style-type: none"> <li>1. Damaged relief valves.</li> <li>2. Low hydraulic oil</li> <li>3. Damaged extension cylinder (internal parts).</li> <li>4. Bent piston rods.</li> <li>5. Excessive material on outrigger beams.</li> <li>6. Binding outrigger beams.</li> <li>7. Damaged selector valve.</li> <li>8. Main hydraulic pump cavitation.</li>   <li>9. Partially shifted hydraulic selector spool.</li>   <li>10. Damaged piston seals.</li> <li>11. Worn or defective hydraulic pump.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove relief valve, clean and/or replace.</li> <li>2. Replenish oil to proper level.</li> <li>3. Remove extension cylinder. Repair as necessary.</li> <li>4. Replace piston rods and seals.</li> <li>5. Clean outrigger beams.</li>   <li>6. Repair or replace outrigger beam.</li> <li>7. Repair or replace valve.</li> <li>8. Replace or tighten hose and fittings.</li> <li>9. Disassemble, clean and polish spool and valve housing with very fine emery cloth (water paper)</li> <li>10. Replace all cylinder seals.</li> <li>11. Replace Hydraulic pump.</li> </ol>
<p><b>CYLINDER EXTENDS WHILE MACHINE IS IN ROAD POSITION</b></p>	<ol style="list-style-type: none"> <li>1. Scored cylinder barrel.</li>   <li>2. Cracked or damaged piston.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace extension cylinder.</li>   <li>2. Replace piston and all cylinder seals.</li> </ol>
<p><b>OUTRIGGER VERTICAL JACK CYLINDER SLOW OR ERRATIC</b></p>	<ol style="list-style-type: none"> <li>1. Piston loose on piston rod.</li>   <li>2. Low hydraulic oil</li> <li>3. Damaged main relief valve.</li> <li>4. Damaged holding valve seals.</li> <li>5. Bent cylinder rod.</li> <li>6. Binding outrigger housing.</li>   <li>7. Excessive material on beams.</li> <li>8. Main hydraulic pump cavitation.</li>   <li>9. Worn or damaged hydraulic pump section.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace all cylinder seals and torque piston lock-nut.</li>   <li>2. Replenish hydraulic oil to proper level.</li> <li>3. Repair or replace valve.</li> <li>4. Replace holding valve seals.</li> <li>5. Replace cylinder rod and seats.</li> <li>6. Repair or replace outrigger housing.</li> <li>7. Clean outrigger beams.</li> <li>8. replace or tighten hose and fittings.</li> <li>9. Replace pump section.</li> </ol>

<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>CHECKOUT PROCEDURES AND REMEDIAL ACTIONS</b>
<b>JACK CYLINDER RETRACTS UNDER LOAD</b>	<ol style="list-style-type: none"> <li>1. Damaged piston seals.</li> <li>2. Damaged holding valve seals.</li> <li>3. Damaged holding valve.</li> <li>4. Scored cylinder barrel.</li> <li>5. Cracked or damaged piston.</li> <li>6. Piston loose on cylinder rod.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace all cylinder seals.</li> <li>2. Replace seals.</li> <li>3. Replace valve assembly.</li> <li>4. Repair or replace barrel.</li> <li>5. Replace piston and all cylinder seals.</li> <li>6. Replace cylinder seals and tighten lock-nut.</li> </ol>
<b>JACK CYLINDER EXTENDS WHILE MACHINE IS TRAVELING</b>	<ol style="list-style-type: none"> <li>1. Damaged piston seals.</li> <li>2. Scored cylinder barrel.</li> <li>3. Cracked or damaged piston.</li> <li>4. Piston loose on cylinder rod.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace all cylinder seals.</li> <li>2. Replace jack cylinder.</li> <li>3. Replace piston and seals.</li> <li>4. Replace seal and re-torque.</li> </ol>
<b>OUTRIGGER SYSTEM WILL NOT ACTIVATE (FROM STOWED OR EXTENDED AND DOWN POSITION)</b>	<ol style="list-style-type: none"> <li>1. Hydraulic oil low.</li> <li>2. Damaged relief valve.</li> <li>3. Damaged control valve.</li> <li>4. Open cradle interlock system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish hydraulic oil to proper level.</li> <li>2. Repair or replace relief valve.</li> <li>3. Repair or replace control valve.</li> <li>4. Close switch or replace.</li> </ol>
<b>OUTRIGGER SYSTEM ACTIVATES , BUT SELECTED OUTRIGGER WILL NOT STOW OR EXTEND AND LOWER AS DESIRED</b>	Clogged , broken or loose hydraulic lines or fittings.	Clean, tighten or replace lines or fittings as required.
<b>INDIVIDUAL OUTRIGGER WILL NOT SET OR STOW</b>	<ol style="list-style-type: none"> <li>1. Damaged piston seals.</li> <li>2. Damaged check valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace seals.</li> <li>2. Repair or replace check valve.</li> </ol>

## SWING SYSTEM TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	CHECKOUT PROCEDURES AND REMEDIAL ACTIONS
<b>LADDER SWING OPERATION ERRATIC IN EITHER DIRECTION</b>	<ol style="list-style-type: none"> <li>1. Low engine RPM.</li> <li>2. Low hydraulic oil.</li> <li>3. Improper movement of control lever to neutral.</li> <li>4. Insufficient lubricant on swing bearing.</li> <li>5. Damaged swing motor.</li> <li>6. Excessive overload.</li> <li>7. Pump cavitation in swing section.</li> <li>8. Improperly torqued turntable bolts.</li> <li>9. Improperly torqued swing motor attachment bolts.</li> <li>10. Malfunction of swing box.</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase engine RPM to obtain smooth swing operation.</li> <li>2. Increase hydraulic oil to proper level.</li> <li>3. Feather controls to neutral to maintain smooth stopping action.</li> <li>4. Lubricate bearing properly.</li> <li>5. Replace swing motor.</li> <li>6. Reduce load (refer to load capacity chart).</li> <li>7. Re-tighten suction hose or replace any damaged fitting.</li> <li>8. Re-torque turntable bolts evenly.</li> <li>9. Re-torque swing motor attachment bolts.</li> <li>10. Remove swing box and make necessary repairs.</li> </ol>
<b>LADDER WILL NOT SWING IN EITHER DIRECTION</b>	<ol style="list-style-type: none"> <li>1. Defective relief valve.</li> <li>2. Swing brake not releasing properly.</li> <li>3. Completely inoperative crossover relief valve.</li> <li>4. Internal damage to swing box.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace drive coupling.</li> <li>2. Repair as necessary.</li> <li>3. Replace crossover relief valve.</li> <li>4. Remove swing box and repair.</li> </ol>
<b>SWING OPERATION SLOW IN EITHER DIRECTION</b>	<ol style="list-style-type: none"> <li>1. Defective relief valve.</li> <li>2. Worn or damaged swing motor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust, repair or replace valve.</li> <li>2. Repair or replace motor.</li> </ol>
<b>SWING OPERATION SLOW IN ONE DIRECTION</b>	Defective relief valve.	Repair or replace relief valve.
<b>SWING BRAKE OPERATION ERRATIC</b>	Air in the swing brake system.	Bleed brake system.
<b>LADDER SWINGS SLOWLY</b>	<ol style="list-style-type: none"> <li>1. Insufficient hydraulic volume.</li> <li>2. Defective swing motor control valve.</li> <li>3. Damaged swing motor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check delivery of hydraulic pump. Make certain sufficient fluid is available to pump. Check pump drive speed.</li> <li>2. Adjust, repair or replace valve.</li> <li>3. Repair or replace motor.</li> </ol>
<b>SWING MOTOR CONTINUES TO OPERATE WHEN SWING CONTROL IS IN NEUTRAL</b>	Control valve sticking or valve otherwise damaged.	Repair or replace valve.

<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>CHECKOUT PROCEDURES AND REMEDIAL ACTIONS</b>
<b>SWING MOTOR TURNING IN WRONG DIRECTION</b>	Improper port connections	Reverse port connections
<b>SWING MOTOR NOISY</b>	<ol style="list-style-type: none"> <li>1. Air in system</li> <li>2. Low fluid level</li> <li>3. Motor binding</li> </ol>	<ol style="list-style-type: none"> <li>1. Bleed air from highest point in circuit and replenish fluid</li> <li>2. Fill to proper level</li> <li>3. Repair or replace</li> </ol>
<b>LADDER SWING OPERATION IN ONE DIRECTION ONLY</b>	Defective swing motor control valve	Clean and re-adjust and / or replace valve



## TELESCOPING LADDER TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	CHECKOUT PROCEDURES AND REMEDIAL ACTIONS
<b>ERRATIC OPERATION OF EXTENDING TELESCOPING CYLINDER</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Defective holding valve.</li> <li>3. Low engine RPM.</li> <li>4. Lack of lubrication on ladder sections.</li> <li>5. Improper cylinder adjustment.</li> <li>6. Worn ladder wear pads.</li> <li>7. Distorted ladder section.</li> <li>8. Damaged telescope cylinder(s)</li> <li>9. Damaged control valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish hydraulic oil to proper level.</li> <li>2. Repair or replace holding valve.</li> <li>3. Increase engine RPM to recommended setting.</li> <li>4. Properly lubricate all ladder sections.</li> <li>5. Re-align cylinders to obtain alignment.</li> <li>6. Replace wear pads and lubricate properly.</li> <li>7. Replace distorted section.</li> <li>8. Repair or replace cylinder(s).</li> <li>9. Repair or replace control valve.</li> </ol>
<b>ERRATIC OPERATION OF RETRACTING TELESCOPING CYLINDER</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Defective holding valve.</li> <li>3. Low engine RPM.</li> <li>4. Lack of lubrication.</li> <li>5. Improper ladder alignment caused from side loading.</li> <li>6. Bent cylinder rod.</li> <li>7. Scored cylinder barrel.</li> <li>8. Damaged piston seals.</li> <li>9. Loose or damaged piston.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish hydraulic oil to proper level.</li> <li>2. Repair or replace holding valve.</li> <li>3. Increase RPM to recommended setting.</li> <li>4. Properly lubricate all ladder sections.</li> <li>5. Reduce and properly hoist load.</li> <li>6. Replace cylinder rod and cylinder seals.</li> <li>7. Repair or replace cylinder barrel.</li> <li>8. Replace all cylinder seals.</li> <li>9. Replace all seals and re-torque or replace piston.</li> </ol>
<b>TELESCOPING CYLINDER WILL NOT EXTEND</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Relief valve malfunctioning.</li> <li>3. Excessive load.</li> <li>4. Broken valve spool.</li> <li>5. Damaged piston seals.</li> <li>6. Damaged piston.</li> <li>7. Broken hydraulic pump shaft.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish oil to proper level.</li> <li>2. Repair or replace relief valve.</li> <li>3. Reduce load.</li> <li>4. Replace valve.</li> <li>5. Replace all cylinder seals.</li> <li>6. Replace piston and all cylinder seals.</li> <li>7. Replace pump</li> </ol>

<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>CHECKOUT PROCEDURES AND REMEDIAL ACTIONS</b>
<b>TELESCOPING CYLINDER WILL NOT RETRACT</b>	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level.</li> <li>2. Relief valve damaged.</li> <li>3. Excessive load.</li> <li>4. Broken valve linkage.</li> <li>5. Broken valve spool.</li> <li>6. Broken piston.</li> <li>7. Damaged piston seals.</li> <li>8. Worn or damaged hydraulic pump.</li> <li>9. Broken hydraulic pump shaft.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish hydraulic oil to proper level.</li> <li>2. Repair or replace relief valve.</li> <li>3. Reduce load (Refer to load chart).</li> <li>4. Replace or repair valve.</li> <li>5. Replace valve section.</li> <li>6. replace piston and all cylinder seals.</li> <li>7. Replace all cylinder seals.</li> <li>8. Replace pump.</li> <li>9. Replace pump.</li> </ol>

*Properly maintained aerial devices, through a test and inspection program, are essential to the safe and economical operation of a fire department. Firefighters depend on these units to perform structurally, mechanically, hydraulically and functionally as intended. An aerial device that fails could result in injury or death to a firefighter or to a person being rescued.*

*KME aerial devices have been designed initially with adequate safety factors. Accidents, overloads, and fatigue can cause problems to develop. A thorough, regularly scheduled inspection and test program can identify potential problems before they cause injuries or unplanned out of service. Furthermore, early discovered defects are less expensive to repair than if they are left to develop into major defects and substantial monetary savings by using written test reports to obtain competitive quotations for repairing the apparatus.*

*This section provides general maintenance procedures and oil recommendations for the 102' Rear Mounted Aerialcat hydraulic system.*

#### **OIL RECOMMENDATIONS**

**O**il in a hydraulic system serves as a power transmission medium. It also serves as the system's lubricant and coolant. Choosing hydraulic oil is not the problem some people believe it to be. There are two important factors in selecting oil:

1. **Anti wear additives** The oil selected must contain the necessary additives to insure high anti wear characteristics and excellent chemical stability.
2. **Viscosity.** The oil selected must have viscosity to maintain a lubricating film at the system's operating temperatures. Suitable types of oil are anti wear type hydraulic oil. There is a common designation for oil of this type, AW-46. The Aerialcat's operating temperatures range from 140 degrees to 160 degrees F.

#### **OIL RECOMMENDATIONS FOR ARTIC CONDITIONS**

Arctic conditions are considered those temperatures that are in the sub zero range. These conditions represent a specialized field where extensive use is made of heating equipment. Before starting, due to the variables involved, not only in temperature but also in type of equipment available, the factory should be consulted for service recommendation.



**Operating temperatures must be closely monitored with all light weight or diluted oil and must not be allowed to exceed 130 degrees C. (270 Degrees F.)**

During cold weather starting, high-speed operation of system components must be avoided until the entire hydraulic system is warmed up to provide adequate lubrication. Start up of each operation after being exposed to the cold for more than a brief period must be considered in extremely cold conditions. When outriggers have been positioned and ladder operations performed for some time, the system and trapped oil will have quickly returned to ambient temperature.

## Approved hydraulic fluids are as follows

### Hydraulic Filters



AW 46 is Standard. Dimension 46 synthetic is for low temperatures.

The hydraulic system contains a pressure and a return line filter. The filter system is equipped with an electrical condition indicator and a bypass that functions if the filter becomes clogged. When the indicator light shows the need, the element should be replaced. The pressure filter is located on the driver's side right frame rail in the pump compartment area. The return filter is located on the driver's side frame rail in the area above the left rear outrigger.

### Replacement Filters and Elements

RETURN FILTER:	SCHROEDER # RLT-9VZ3-S20-50-MS5
RETURN ELEMENT:	SCHROEDER # 9VZ5
PRESSURE FILTER:	SCHROEDER #DF401CCZ3050-MS5
PRESSURE ELEMENT:	SCHROEDER # CCZ5

### HYDRAULIC SYSTEM GENERAL

**KEEP THE SYSTEM CLEAN**—Contamination causes the majority of system failures. Most hydraulic systems re-circulate the same fluid. Although the system is closed, it is not entirely dirt and chemical proof. Harmful dirt, foreign particles and chemicals introduced or produced by wear. Lint and other foreign matter enter when the system is opened during parts replacement and filter changes. Chemical contamination is introduced by solvents used when cleaning components. These solvents can easily destroy the effectiveness of the oil.

Another source of contamination is replenishing the hydraulic fluid with unfiltered oil. The secret to trouble-free operation is proper filter maintenance and clean filtered oil replenishing.

If the system should become contaminated, the best procedure for cleaning the system is to retract all cylinders, remove the oil from the hydraulic tank, and replenish the oil using a **filtered system capable of at least three (3) microns (nominal)**. Change the pressure and return line filters. Operate the unit in-service operations. If the system is still contaminated, professional help may be required. Components may have to be removed, cleaned or replaced, and re-installed. This is an expensive and time consuming operation and should only be used as a last resort.

### BE CAREFUL WHEN YOU ADD OR CHANGE OIL.

Be sure the system is clean each time you change or add oil. If you simply adding make-up oil, be sure that the oil in the system is clean. If not, drain the system as soon as possible. Refill the system with a change of new oil that will give satisfactory performance under existing conditions. When you add or change oil it should be filtered to at least 3-micron nominal.

The **mixing of oil brands is not recommended** because they usually are not compatible. This can cause chemical contamination. If the oil brand is to be changed, then a flushing solution should be used first.

#### **HYDRAULIC OIL RESERVOIR**

The hydraulic reservoir provides storage for the Aerialcat's hydraulic system oil. Capacity of the reservoir is 67 - gallons. The reservoir incorporates a filler cap with dipstick and drain plug. The tank is equipped with integral baffles that aid in cooling the oil before it re-circulates through the system and also prevents the oil from sloshing during travel.

#### **FILLING**

With the Aerial device stowed in travel position (all cylinders retracted with ladder in cradle) fill the reservoir within four (4)-inches of the top of the tank.

#### **EXTENSION/RETRACTION CABLE MAINTENANCE**

The wire rope cables are lubricated during manufacturing so that the strands—as well as the individual wires in the strands—may move and adjust as the rope moves and bends. But no wire rope can be lubricated sufficiently during manufacture to last its entire life. That's why it's important to lubricate periodically throughout the life of the rope.

The surface of some ropes may become covered with dirt, rock dust or other material during their operation. This can prevent field-applied lubricants from properly penetrating into the rope, so it's a good practice to clean these ropes before you lubricate them.

We recommend the use of Wire Rope lubricant for re-lubrication of all wire rope. Wire rope lubricant is specially formulated to penetrate to the core of the rope and maintain the flexibility built into your wire rope. Wire rope lubricant is non-tacky, forming a dry film when exposed to air and therefore will not attract dirt. Wire rope lubricant contains molybdenum which coats individual wire providing maximum friction reduction between the strands. Wire rope lubricant is used at temperatures from -50° to 150°F and can be readily applied in the field using a sprayer.

The lubricant you apply should be light-bodied enough to penetrate to the rope's core. You can normally apply lubricant by using one of the three methods: drip it on the rope, spray it on or brush it on. In all cases, you should apply it at a place where the rope is bending such as around a sheave. It is recommended the lubricant be applied at the top of the bend because that is where the rope's strands are spread by bending and more easily penetrated. In addition, there are pressure lubricators available commercially. Your rope's service life will be directly proportional to the effectiveness of the method you use and the amount of lubricant that reaches the rope's working parts.

A proper lubricant must reduce friction, protect against corrosion and adhere to every wire. It should also be pliable and not crack or separate when cold—yet not drip when warm.

#### **HYDRAULIC ELECTRIC SWIVEL ASSEMBLY**

The swivel assembly is mounted at the center of rotation of the turntable. It is of compact design incorporating the hydraulic pressure and return load sense lines, one (1) 5-inch water passage, and thirty two (32) electrical circuits. The design allows 360 degrees rotation of the ladder and provides through passage for the hydraulics, water and electrical circuits.

#### **\*\*NOTE\*\***

**No field repairs can be made to the swivel assembly. If any leaks or electrical malfunctions occur within the swivel, the complete unit must be removed and replaced.**

## CYLINDER REPLACEMENT INSTRUCTIONS

### Lift cylinders



**These cylinders must be removed with the ladder in the travel support.**

1. Support the cylinder with an overhead crane using nylon straps around the cylinder.
2. Remove Rod end retainer spiral lock ring.
3. Remove the rod end pin and spacers.
4. Lower the cylinder – be sure to clear the base section of the ladder while lowering.
5. Remove hydraulic lines and plug fittings to keep debris from entering the hydraulic system.
6. Remove the barrel end retainer nut.
7. Remove barrel end pin and spacers.
8. Lift cylinder clear of turntable base.
9. To install, reverse procedure.



During reassembly, adjustments may have to be made to line up rod and barrel end pins. If this is necessary, Plug the opposite end hose.

**DO NOT LEAVE THEM HOOKED TO THE OTHER CYLINDER!**

Use the truck EPU hydraulics to make the stroke adjustments.

#### **Outrigger extension cylinders**

1. Extend outriggers fully.
2. Mark the location of the outrigger cover and remove the cover.
3. Remove the outrigger access panel on the opposite side of the truck (This may require removing the opposite side outrigger cover).
4. Disconnect the wiring harness.
5. Mark and remove the three (3) hydraulic hoses and pull them out of the way.

6. Plug the hoses and fittings on the cylinder.
7. Remove the four (4) cylinder pin retaining bolts.
8. Push the outrigger back far enough for the pin to clear holders and drop cylinder end down.
9. Remove the wear pad and the Micro switch from underside of the outrigger beam.
10. Using an overhead crane, strap or chain around the outrigger housing, slowly pull the outrigger beam out until the end of the cylinder has cleared the torque box housing.

**NOTE**

**It may be necessary to support the outrigger extension cylinder when pulling the outrigger beam out**

11. Remove the four (4) countersunk screws in the barrel end pin of the outrigger beam using a 5/16" Allen wrench and remove the pin.
12. Slowly slide the outrigger cylinder out of the outrigger beam.
13. Reverse procedure for installation

**NOTE**

14. **Be sure to note the routing of the hoses inside the outrigger beam!**



**Outrigger Jack Cylinders**

1. Extend outrigger beam fully over a wall or pit.
2. Using the truck EPU hydraulics, lower jack approximately 2".
3. Remove and plug the two hydraulic hoses and fittings on the jack cylinder.
4. Support the underside of the jack swivel pad with a tow motor or jack.

Remove the four (4) 3/8" socket head screws at the top of the outrigger jack housing.



If the swivel pad is not supported the jack assembly will fall from the outer jack housing.

5. Slowly lower the jack assembly, clear of the outer housing.
6. Mark the swivel pad and tube location and remove the four (4) hex head bolts in the bottom of the jack cylinder that attach them.
7. Reverse procedure for installation.



**NOTE:** Pad Handle should be placed facing inside or under vehicle.



**IF YOUR UNIT HAS AN AIR-RIDE SUSPENSION, DO NOT PULL OUT IMMEDIATELY AFTER THE FIRE FIGHTING MISSION. EVERYTIME THE OUTRIGGERS ARE DEPLOYED AND STOWED, ENSURE THAT THE AIR PRESSURE IS BUILT UP BEFORE MOVING THE UNIT. INSUFFICIENT AIR IN THE SUSPENSION SYSTEM CAN CAUSE EQUIPMENT DAMAGE OR FAILURE.**

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*102' Rear-Mount Aerial*





## TELESCOPIC WATERWAY MAINTENANCE

1. All components are thoroughly greased at assembly. Since internally lubricated seals are used, regular greasing is not required. We recommend components not be greased at installation.
2. Slip Tube Assemblies may be greased at the regularly scheduled Aerial Inspections. The seals in the Slip Tube Assemblies are self-lubricating, so greasing is not mandatory. We do recommend a visual inspection of the Slip Tube Assembly while it is fully extended after initial installation, from that point on we recommend inspection every ten hours of aerial operation. If any deposits of aluminum appear, they are to be rubbed off using a Teflon scouring pad. Slip Tube Assemblies are designed to give long maintenance free service; however, like any product, problems may occur and periodic visual inspections will aid in determining if a potential problem exists and warrants a call to us. Care must be taken to keep debris off of extended tubes. We recommend wiping tubes with light oil (10 weight) or hydraulic oil after use, if tubes appear to have contamination on them.

**UNDER NO CIRCUMSTANCE ARE TUBES TO BE CLEANED WITH LACQUER THINNER, OR ANY OTHER SOLVENT.**

### 10 HOUR (MONTHLY INSPECTION)

**IMPORTANT**

**PERFORM THIS INSPECTION WITHIN THE FIRST 10 HOURS OF OPERATION AFTER THE DEVICE HAS BEEN PUT INTO SERVICE AND WITH EACH INSPECTION THEREAFTER.**

1. Hydraulic Oil Level, Remove dipstick and add oil to within four inches of the top of the dipstick.

**IMPORTANT**

**Check hydraulic oil level with ALL cylinders in the retracted position**

2. Service complete ladder. (See lubrication charts)
3. Inspect frame torque box and ladder assembly for visible damage and missing parts.
4. Check all hose ends and tube fittings for signs of leakage while their circuit is pressurized.
5. Check auxiliary pumps for operation.
6. Check oil level in swing gear box as follows: (It can be checked with the ladder in the cradle if accessible, or with the aerial elevated)

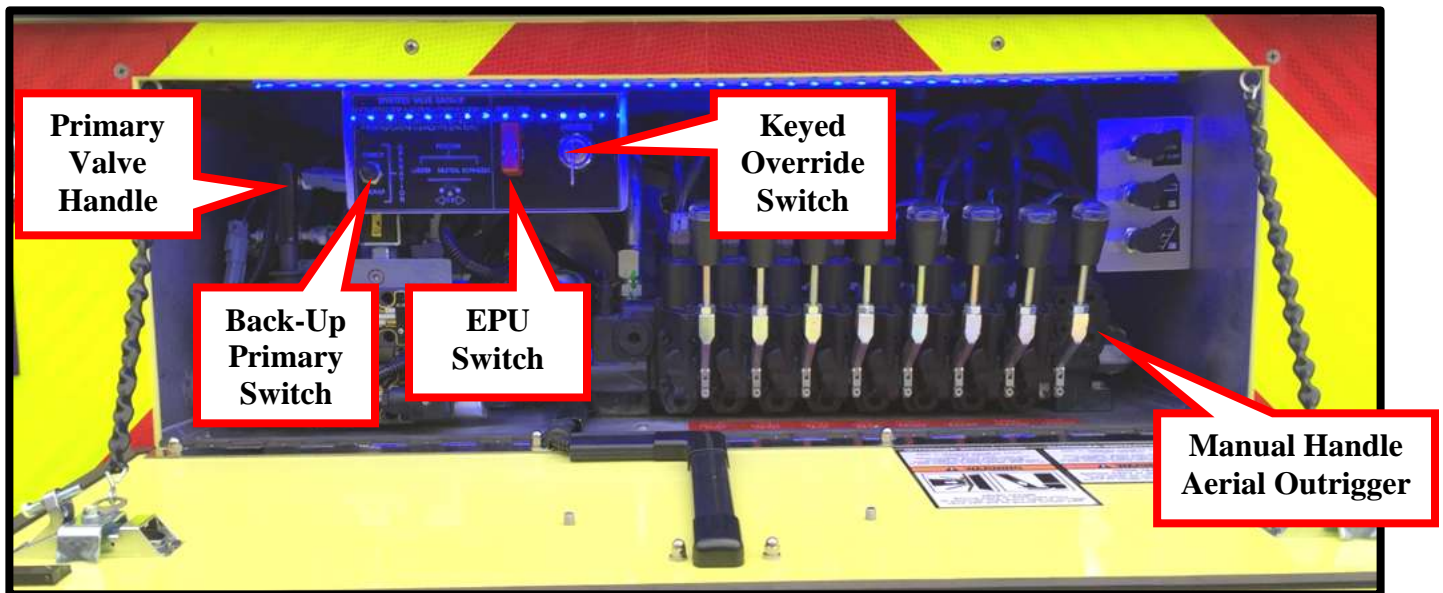


Remove plug using 5/16” Allen wrench.

Fill with 85W 90 gear oil to bottom of hole.

Re-install plug.

7. Check all lights and switches for proper operation.
8. Check ladder control levers for proper operation.
9. Check all hydraulic functions for smoothness and proper operation.
10. Check general condition of extension/retraction cables for fraying and deterioration.
11. Check outrigger – ladder safety interlock system as follows:
  1. With outriggers in stowed position and LADDER POWER override OFF, attempt to raise the aerial device. NO aerial movement should function. If any aerial movement occurs, apparatus MUST be placed out of service and repaired immediately.
  2. Set up and level apparatus in accordance with Outrigger system operation (Section 7 – Outrigger system operation). Raise ladder slightly out of the cradle (6 – 12 inches). Attempt to raise any one jack by moving the valve switch up. If ANY movement occurs, apparatus MUST be placed out of service and repaired immediately.
12. Extend ladder, wipe down water pipe see previous section Telescopic Waterway Maintenance and re-lubricate.
13. Attempt to operate ladder at the pedestal without depressing the foot switch (deadman switch). No movement should occur. If ladder operates, place the unit out of service and repair immediately.
14. Check diverter valve override system as follows:



1. Switch from primary system to back-up.
2. Set up and level unit in accordance with Outrigger System Operations (Section 7, System operations)
3. Operate aerial (**Remember, ALL electrical interlocks are disengaged and all valve control handles are operational**). If ladder and outriggers operate using the diverter valve override system, O.K. If not apparatus must be placed out of service and repaired immediately.
4. Return diverter valve override system to primary operation mode. **NEVER** leave ladder in back-up mode if ladder is not being used or stowed for service.

#### **30 HOUR (3 MONTH INSPECTION)**

1. Check hydraulic reservoir, supply lines and fittings for security, visible damage and leakage.
2. Check PTO and hydraulic pump for tightness and leakage
3. Check hydraulic swivel couplings for visible damage and/or signs of leakage.
4. Check jack cylinders for drift down:
  - a. Set the unit up as described in the normal setup procedures
  - b. Using a marking pencil of some type mark both inner jack boxes ½” under the outer jack box.
  - c. Let the unit sit for 15 minutes, then a period of 1 hour. If the jack has drifted beyond the ½” mark there is a problem that needs to be repaired.
5. Check all hydraulic valves for security, visible damage and leakage.
6. Check aerial lift cylinders for drift down.
  - a. Set the unit up as described in the normal setup procedures. Raise the aerial to full elevation.
  - b. Using a marking pencil of some type mark both base rails to the first fly rail.
  - c. Let the unit sit for 15 minutes, then a period of 1 hour. If the cylinder rod has drifted beyond the ½” mark there is a problem that needs to be repaired.
7. Check wiring on electric swivel for binding and corrosion.
8. Check ladder guides/wear pads for security, visible damage and binding.
9. Check ladder pivot shaft for security and visible damage.

#### **250 HOUR (ANNUAL) INSPECTION**

1. Sample hydraulic oil and change if needed.

2. Re-torque all bolts per Bolt Torque Chart.
3. Test the aerial device in accordance with NFPA recommendation for Aerial Ladder and Elevating Platforms. **This test shall also be conducted in the event of suspected damage to the aerial ladder or ANY of it's components.**

Following are tests and inspections that need to be incorporated into the Maintenance of the apparatus. They are recommendations derived from NFPA considerations. KME will gladly support the Fire department and assist with custom tailoring these inspections with Department needs.

#### **STRUCTURAL INSPECTION**

#### **VISUAL INSPECTION**

A complete inspection of:

- Outriggers; Pads, structure, welds, bolts, hoses, fittings, cylinders, holding valves, pins and retainers.
- Chassis; Truck frame, aerial sub-frame/mounting, suspension, PTO, brake hoses, hydraulic components, electrical components, brake lock assembly, steering components, exhaust system and cooling system.
- Pedestal; Mounting bolts/welds, pedestal structure, attachment welds/pins, hydraulic swivel joint, hydraulic components, swing drive gear box/mounting bolts and backlash between swing drive pinion/gear.
- Rotation Bearing; Upper/lower bearing attachment weld/bolts and vertical movement of bearing. Proper torque on bearing bolts.
- Turntable; Turntable structure, hydraulic components, lower control operation, spotlights and intercom.
- Base ladder structure, welds, lift cylinders/attachment, hydraulic components/lines, cables/cable anchors, extend cylinder/attachment, boom rest supports, extension sheave roller assemblies and wear pads.
- Ladder and Extension Sections; Base, Lower Mid, Upper Mid and Fly; Inspect rails, rungs, handrails for, structural welds, dents and gouges, sheave roller assembly components, wear pads/attachments, cables/cable anchors, and lubrication.
- Waterway; waterway components, attaching brackets and monitor operation.
- General; Load rating chart, electrical hazard placards and upper/lower control placards.

#### **FUNCTIONAL and OPERATIONAL TESTING**

A. Functional Test: A functional and operational test to check the operation of controls, bearings, pins, bushings, cylinders, holding valves, ladder extension cables, outriggers, waterways, etc. This test will also

indicate worn swing bearings/gear boxes, worn pins/bushings and loose bolts critical to the operation of the aerial.

B. Operational Test: A complete cycle of aerial ladder operation. The ladder should be fully elevated out of the bed, rotated 90 degrees and extended to full height. This test will also demonstrate successful operation of all ladder controls.





C. Drift Test: Place the aerial device at full elevation, marking the cylinder piston on the second section in relation to in relation to the base section and allow the ladder to stand for 15 minutes, then one hour with engine off.



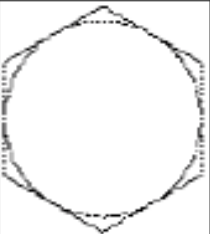

#### **LOAD AND STABILITY TESTS**

Load and Stability tests are required on each aerial ladder. These tests confirm the device can be operated smoothly and without any undue vibration. Full operating range tests are required at specified ratings to determine stability and acceptable operation under load.

#### **OIL ANALYSIS**

Chemical analysis of oil in engines, transmissions and hydraulic systems is available. This analysis determines type and amount of contamination, which is important for proper scheduling of maintenance of equipment.

Identification Grade Mark	Specification	Description	Material	Proof Load	Yield Strength Min (psi)	Tensile Strength Min (psi)
	SAE J429 Grade 5  ASTM A449	Bolts, Screws, Studs	Medium Carbon Steel,	85,000 74,000	92,000 thru 81,000	120,000 thru 105,000
	SAE J429 Grade 5.1	Sems	Low or Medium Carbon Steel	85,000	-	120,000
	SAE J429 Grade 5.2	Bolts, Screws, Studs	Low Carbon	85,000	92,000	120,000
	SAE J429 Grade 7	Bolts, Screws	Medium Carbon Alloy Steel	105,000	115,000	133,000

Identification Grade Mark	Specification	Description	Material	Proof Load	Yield Strength Min (psi)	Tensile Strength Min (psi)
	SAE J429 Grade 8	Bolts, Screws, Studs	Medium Carbon Alloy Steel	120,000	130,000	150,000
	ISO R898 Class 4.6	Bolts, Screws, Studs	Low or Median Steel	33,000	36,000	60,000
	ISO R898 Class 5.8	Bolts, Screws, Studs	Low or Median Steel	55,000	57,000	74,000
	SAE J429 Grade 8.1	Studs	Medium Carbon Steel	120,000	130,000	150,000

# SAE Straight Thread **Port Assembly** (SAE J1926)

SAE Dash Size	Thread Size UN/UNF	Assembly Torque (+10%-0)											
		Non-Adjustable				Adjustable				Plugs			
		Seal-Lok		Triple-Lok Ferulok Pipe Fittings		Seal-Lok		Triple-Lok Ferulok		Hollow Hex HP5ON-S		Hex Head P5ON-S	
		Ft.lbs (in. lbs.)	N-m	Ft.lbs (in. lbs.)	N-m	Ft.lbs (in. lbs.)	N-m	Ft.lbs (in. lbs.)	N-m	Ft.lbs (in. lbs.)	N-m	Ft.lbs (in. lbs.)	N-m
2	5/16-24	---	---	(85)	10	---	---	(60)	7	(30)	3.5	(85)	10
3	3/8-24	---	---	(155)	18	---	---	(100)	11	(55)	6	(155)	18
4	7/16-20	(310)	35	(260)	29	(180)	20	(180)	20	(120)	13.5	(260)	29
5	1/2-20	(360)	40	(280)	32	(360)	40	(250)	28	(170)	19	(280)	32
6	9/16-18	(420)	46	(350)	40	(420)	46	(350)	40	(410)	46	(350)	40
8	3/4-16	60	80	(620)	70	60	80	(620)	70	60	80	(620)	70
10	7/8-14	100	135	85	115	100	135	85	115	100	135	85	115
✓ 12	1 1/16-12	135	185	135	185	135	185	135	185	135	185	135	185
✓ 14	1 3/16-12	175	235	175	235	175	235	175	235	175	235	175	235
✓ 16	1 5/16-12	200	270	200	270	200	270	200	270	200	270	200	270
20	1 5/8-12	250	340	250	340	250	340	250	340	250	340	250	340
24	1 7/8-12	305	415	305	415	305	415	305	415	305	415	305	415
32	2 1/2-12	375	510	375	510	375	510	375	510	375	510	375	510

Note: Lubricate threads before assembly! Values in chart are for steel fittings in steel ports. For stainless steel fittings, please use the upper limit of torque range. For brass, aluminum (and other soft metals), decrease torque value by 35%.

Table S1 -- SAE J1926 Straight Thread Port Assembly Torques

## Seal-Lok®

Parker's recommended assembly method for Seal-Lok® connections is the torque method.

Swivel Nut Torque				
Dash Size	Newton Meters 10% / -0)	(+)	Pound Feet (+ 10% / -0)	Flats From Wrench Resistance (FFWR)
-4	25		18	1/2 - 3/4
-6	40		30	1/2 - 3/4
-8	55		40	1/2 - 3/4
-10	80		60	1/2 - 3/4
-12	115		85	1/3 - 1/2
-16	150		110	1/3 - 1/2
-20	205		150	1/3 - 1/2
-24	315		230	1/3 - 1/2
-32	---		---	---

NOTE: The assembly torques listed are higher than the test torques published in SAE J1453



# AERIAL DEVICE INSPECTION SCHEDULE

	Daily	Weekly or 10 Hours	Monthly or 30 hours	Scheduled 6 Months or 125 Hours	Safety Annual or 250 hours
Check Hydraulic oil level in reservoir	X	X	X	X	X
Rung Covers secured	X	X	X	X	X
Ladder Intercom operates properly	X	X	X	X	X
Ladder spot, flood and scene lights operate	X	X	X	X	X
Ladder AC lighting operates properly	X	X	X	X	X
Breathing air system OK	X	X	X	X	X
Platform access doors latching properly	X	X	X	X	X
Mansaver bars operate properly	X	X	X	X	X
Service Complete Ladder (See Lube Chart)		X	X	X	X
Wear pads secured		X	X	X	X
Inspect Frame Torque Box and Ladder Assembly for Visible Damage and/or missing parts		X	X	X	X
Engage Hyd. Pump: Check all Hydraulic System hose ends and tube fittings for signs of leakage		X	X	X	X
Check Auxiliary Pumps for operation		X	X	X	X
Check Hydraulic System filter condition light		X	X	X	X
Check Oil level in swing gear box		X	X	X	X
Check all ladder operation indicator lights and switches for proper operation		X	X	X	X
Check ladder control levers for proper operation		X	X	X	X
Check outrigger controls for proper operation		X	X	X	X
Check all hydraulic functions for smoothness and proper operation		X	X	X	X
Check general condition of cables for fraying and/or deterioration		X	X	X	X
Check outrigger/ladder safety interlock system		X	X	X	X
Extend ladder, wipe down aerial water pipe and re-lubricate		X	X	X	X
Attempt to operate ladder at the pedestal without depressing foot switch – NO MOVEMENT SHOULD OCCUR		X	X	X	X
Check Diverter Valve override system		X	X	X	X
Check Hydraulic oil reservoir, supply lines and fittings for security, visible damage and leakage			X	X	X
Check Hydraulic Pump and PTO for tightness and leakage			X	X	X
Check hydraulic swivel coupling for security, visible damage and leakage			X	X	X
Check jack and lift cylinders for drift down			X	X	X
Check Hydraulic valves for security, visible damage and leakage			X	X	X
Check wiring on electric swivel for bind and corrosion				X	X

	Daily	Weekly or 10 Hours	Monthly or 30 hours	Scheduled 6 Months or 125 Hours	Safety Annual or 250 hours
Check ladder pivot shafts for security and visible damage			X	X	X
Sample hydraulic oil and change if needed					X
Re-torque all bolts per torque chart					X

The preceding table has listed the periodic inspections to be conducted and the specific intervals at which such inspections should be performed. Intervals are nominal, based on normal operating conditions.

Intervals should be adjusted accordingly for extremes of temperature or other adverse operating conditions existing in the area of vehicle operation.

# Aerial Operations Checklist



## HYDRAULIC SYSTEM

Initial box if okay, note any problems in comments.

	OK
Tank full	<input type="checkbox"/>
Hydraulic pump pressure	<input type="checkbox"/>
Check pump for leaks	<input type="checkbox"/>
Check valve manifold for leaks	<input type="checkbox"/>
Check diverter valve for proper operation	<input type="checkbox"/>

	OK
Check pressure filter for leaks	<input type="checkbox"/>
Check return filter for leaks	<input type="checkbox"/>
Check hydraulic supply and return lines for leaks	<input type="checkbox"/>
Check ladder lowering relief valve pressure	<input type="checkbox"/>
Check swing drive gear lube level	<input type="checkbox"/>

Additional comments:

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## EMERGENCY PUMP SYSTEM

Initial box if okay, note any problems in comments.

	OK
Visually inspected	<input type="checkbox"/>
No leaks on fitting or hoses	<input type="checkbox"/>
Lines free from bends, cuts, sharp edges, etc.	<input type="checkbox"/>

	OK
Pump runs and indicators function properly	<input type="checkbox"/>
Wires connected and terminals secure	<input type="checkbox"/>
Check that all functions work with EPU	<input type="checkbox"/>

Additional comments:

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**OUTRIGGERS – LEFT SIDE**

Initial box if okay, note any problems in comments.

	<b>Front</b>	<b>Rear</b>
Visually inspected		
No leaks on fittings or hoses		
No binding or rubbing areas		
Outrigger covers clear body		
Outrigger covers fastened securely		
Operation panel secure & terminals secure		

Additional comments:

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**OUTRIGGERS – RIGHT SIDE**

Initial box if okay, note any problems in comments.

	<b>Front</b>	<b>Rear</b>
Visually inspected		
No leaks on fittings or hoses		
No binding or rubbing areas		
Outrigger covers clear body		
Outrigger covers fastened securely		
Operation panel secure & terminals secure		

Additional comments:

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## OUTRIGGER CONTROLS

Perform these tests and initial box if okay and record function time, note any problems in comments.

	OK
Outrigger movement alarm functions will all movements	<input type="checkbox"/>
Panel lights	<input type="checkbox"/>
Fast idle switch	<input type="checkbox"/>
Left front outrigger extend indicator Light	<input type="checkbox"/>
Front left outrigger jack indicator light	<input type="checkbox"/>
Rear left outrigger extension indicator light	<input type="checkbox"/>
Rear left outrigger jack indicator light	<input type="checkbox"/>
Right front outrigger extend indicator light	<input type="checkbox"/>
Front right outrigger jack indicator light	<input type="checkbox"/>
Rear right outrigger extension indicator light	<input type="checkbox"/>
Rear right outrigger jack indicator light	<input type="checkbox"/>
“Ladder Power” indicator light is illuminated	<input type="checkbox"/>

## LADDER INTERLOCK CHECKS

Set outriggers properly then perform steps listed. Initial box if okay, note any problems in comments.

1. Confirm that the “Ladder Power” indicator light is illuminated.
2. Place the diverter valve to the “Neutral” position.
3. Raise ladder out of cradle.

OK

Confirm that outriggers do not function

Additional comments:

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1. Lower ladder back into cradle.
2. Shift diverter valve to the "Ladder" position.

**OK**

Confirm that outriggers do not function  
 "Ladder Power" switch at console "OFF", should be no power  
 "Ladder Power" switch at console "ON", should be power


Additional comments:

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**OUTRIGGER INTERLOCK CHECKS**

Set all outriggers properly with the exception of one, then perform steps listed. Initial box if okay, note any problems in comments.

1. Confirm that the "Ladder Power" indicator light is not illuminated and try to raise the ladder.

Left Front outrigger not down	Left Rear outrigger not down	Right Front outrigger not down	Right Rear outrigger not down
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Confirm that ladder does not function

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Additional comments:

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**ENGINE/TRANSMISSION INTERLOCK CHECKS**

Release the parking brake, then with foot on brake, place the transmission into “Drive” and check for operation of each outrigger and the ladder. No movement should occur.

	Left Front outrigger	Left Rear outrigger	Right Front outrigger	Right Rear outrigger	Ladder
Confirm that nothing moves					

Additional comments:

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**CHECK EMERGENCY POWER UNIT AT TURNTABLE**

Perform these tests and initial box if okay, note any problems in comments.

	OK		OK
Raise	<input type="checkbox"/>	Lower	<input type="checkbox"/>
Extend	<input type="checkbox"/>	Retract	<input type="checkbox"/>
Rotate left	<input type="checkbox"/>	Rotate right	<input type="checkbox"/>

Additional comments:

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**LADDER ELEVATION DRIFT TEST**

Perform these tests and record value in box, note any problems in comments.

- 1. Raise the ladder to 60° elevation
- 2. Extend the ladder to full extension

Note: re-zero dial indicators after 15 minutes, then start the one hour drift test.

	Distance [in] (left side)	Distance [in] (right side)
Amount lowered after one (1) hour		

Additional comments:

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**LADDER EXTENSION DRIFT TEST**

Perform these tests and record value in box, note any problems in comments.

- 1. Raise the ladder to full elevation
- 2. Extend the ladder to 10 feet

Note: re-zero dial indicators after 15 minutes, then start the one hour drift test.

	Distance [in] (left side)	Distance [in] (right side)
Amount lowered after one (1) hour		

Additional comments:

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**OUTRIGGER DRIFT TEST**

Perform these tests and record value in box, note any problems in comments.

- 1. This test should be performed while the ladder drift test is being conducted.

	Distance [in] (left front)	Distance [in] (right front)	Distance [in] (left rear)	Distance [in] (right rear)
Amount lowered after one (1) hour				

Additional comments:

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# TURNTABLE OPERATION

Perform these tests and initial box if okay, note any problems in comments.

	OK		OK
Remote engine start	<input type="checkbox"/>	Intercom functions properly	<input type="checkbox"/>
Power when foot switch is actuated	<input type="checkbox"/>	No power when foot switch is released	<input type="checkbox"/>
Fast idle	<input type="checkbox"/>	Turntable treadplate fasteners in place	<input type="checkbox"/>
Nozzle controls	<input type="checkbox"/>	Grease fittings present and accessible	<input type="checkbox"/>
Check for binding hoses in turntable	<input type="checkbox"/>	All hoses and wires are secured	<input type="checkbox"/>
Check for rubbing of ladder on turntable	<input type="checkbox"/>	Rung alignment indicator light functions	<input type="checkbox"/>
Grease, dirt, and objects cleared from turntable	<input type="checkbox"/>	Cradle alignment indicator functions	<input type="checkbox"/>
Angle indicator installed	<input type="checkbox"/>	Stainless steel scuff plates mounted on base section	<input type="checkbox"/>
Ladder lights function properly	<input type="checkbox"/>	Lock nuts on cable ends	<input type="checkbox"/>

Additional comments:

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**LADDER GENERAL**

Initial box if okay, note any problems in comments.

	<b>OK</b>
All warning labels and decals in place	<input type="checkbox"/>
Auxiliary pads supplied and in place	<input type="checkbox"/>
Safety chains on turntable in place	<input type="checkbox"/>
Ladder properly lubricated	<input type="checkbox"/>
Inspect waterway for proper alignment and lubrication	<input type="checkbox"/>
Check extension/retraction cable and pulleys	<input type="checkbox"/>
Inspect wear pads	<input type="checkbox"/>
Check lift cylinders for synchronous operation	<input type="checkbox"/>
Check water monitor for proper operation	<input type="checkbox"/>
Inspect rung covers	<input type="checkbox"/>
Check breathing air system for leaks	<input type="checkbox"/>

**Manufacturer's Record of Aerial Ladder Construction**

Date:	GSO: <b>10426</b>	Model Year: <b>2018</b>
Model: <b>3S-102-1000-TA-RM</b>	Serial Number: <b>K102602</b>	
Vehicle Identification No. (VIN): <b>1K9AF6M82JN058645</b>		
Customer Name: <b>Township of Brick, NJ – Laurelton Fire Company</b>		
Address: <b>1725 Route 88, West</b>		
City: <b>Brick</b>	State: <b>NJ</b>	Zip Code: <b>08723</b>
Rated Vertical Height: <b>102'</b>	Rated Horizontal Reach: <b>93'</b>	
Rated Capacity at Maximum Horizontal Reach: <b>#1000</b>		
Multiple Configurations: Yes _____ No <b>X</b>		(If yes, see attached definition of each multiple configuration (load chart))

NFPA 1914 Service Data Required

- A. Specify the location, size, grade and torque specification of all structural bolts on the serial device structure as required by NFPA.

Location	Size (in)	Grade	Torque Specification (lbf-ft)
Upper Rotation Bearing	1	8	900
Lower Rotation Bearing	1	8	900
Torquebox to Frame	3/4	8	370
Rotation Swing Drive	7/8	8	590
Ladder Cradle to Cradle Mount	1/2	8	105
Cradle Mount to Frame	3/4	8	370
Chassis Suspension Mounting	5/8	8	200

- B. High Idle Engine Speed: **1400-1500 rpm**
- C. Hydraulic System Pressure: **Turntable Gauge 3450-3550 psi**
- D. Aerial/Transmission Interlock: **Yes**
- E. Engine Speed Interlocks: **Yes**
- F. Maximum Rotation Gear Train Backlash: **0.375 inch**  
Measurement Location: **Front Center of Turntable Base Plate**
- G. Maximum Rotation Bearing Inner to Outer Race Clearance: **0.06 inch**  
Measurement Location: **On Turntable Bearing Inner Race**

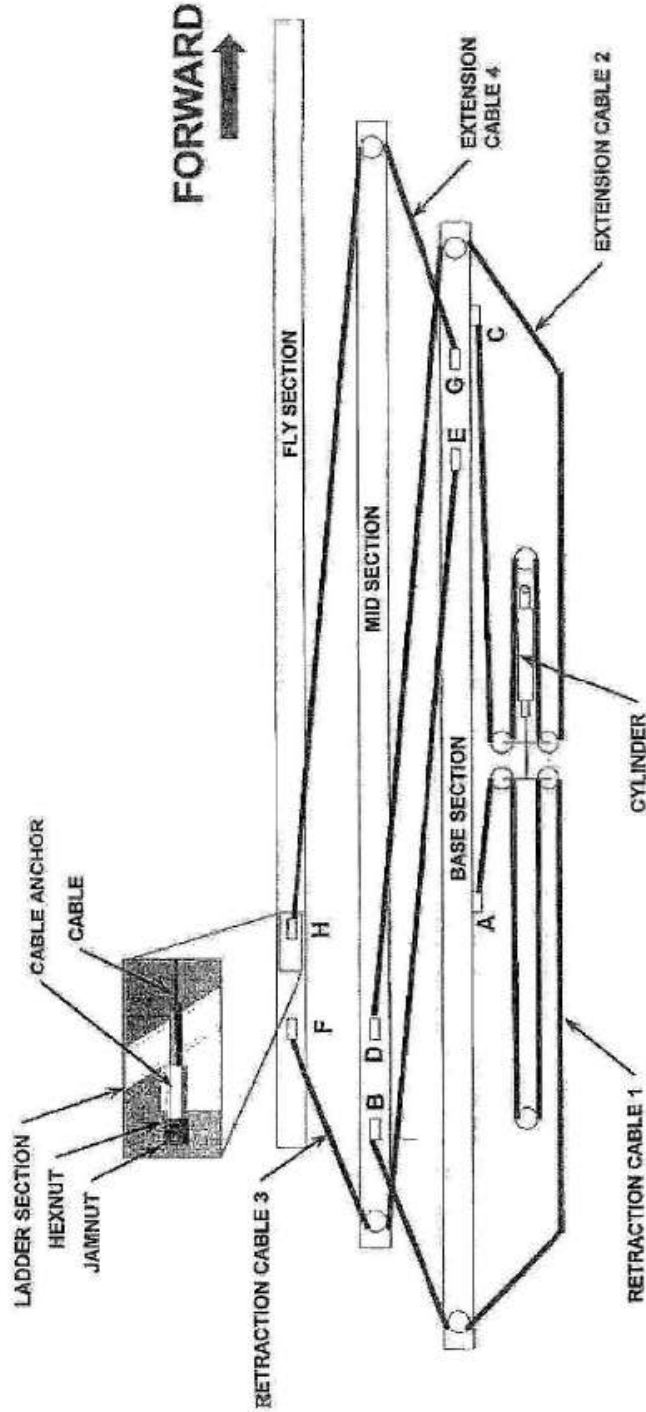
**Manufacturer's Record of Aerial Ladder Construction**  
***(Continued)***

- H. Maximum Elevation Cylinder Drift: **0.5 inch**  
Measurement Location: **On Cylinder Rod**
  
- I. Maximum Extension Cylinder Drift: **0.5 inch**  
Measurement Location: **Base Section to First Mid-Section**
  
- J. Maximum Stabilizer Cylinder Drift: **0.5 inch**  
Measurement Location: **Jack Tube to Jack Housing**
  
- K. Boom/Ladder Section Maximum Twist: **1" Per Ladder Section**
  
- L. Ladder Side Pull with Waterway (#350): **24"**
  
- M. Ladder Side Pull Without Waterway (#220):
  
- N. Rated Water System Pressure: **225 psi**
  
- O. Water System Relief Valve Setting: **265 psi**
  
- P. Rated Water System Flow: **1,000 gpm**
  
- Q. Breathing Air: **Yes**  
Air Cylinder Regulator Pressure Setting: **6,000 (psi)**

# Aerial Ladder Timing Chart



AERIAL LADDER TIMING CHART					
SECTION	TO ADVANCE LADDER		TO RETRACT LADDER		
	LOOSEN	TIGHTEN	LOOSEN	TIGHTEN	
FLY	F or E	H or G	H or G	F or E	
LOWER MID	B or A	D or C	D or C	B or A	



EXTENSION CABLES	RETRACTION CABLES
C - D	A - B
G - H	E - F

← EXTENSION
RETRACTION →

## **Lubrication Chart**

(every ten hours of operation)

<b>NO.</b>	<b>LUBRICATION POINTS</b>	<b>QUANTITY</b>	<b>LOCATION AND INSTRUCTIONS</b>	<b>LUBE TYPE</b>
1	Bottom plate outriggers	Wipe on	All outrigger beams should be fully extended and the bottom coated with grease	MPG
2	Turntable bearing	4 zerks	Turntable center plate at grease zerks	MPG
3	Ladder pivot	2 zerks	Outside each pivot shaft	MPG
4	Lift cylinder turntable end	2 zerks	On each end yoke	MPG
5	Lift cylinder ladder end	2 zerks	On each pin end	MPG
6	Wire rope sheaves	spray on	At sheave shaft	MO
7	Wire rope (cables)	wipe or spray on	On cable	WRL
8	Swing box gear case	fill to pipe plug	Fill to plug level on side of case	GL
9	Wear pads and rail surfaces	wipe clean/ wipe on	Clean and grease bottom , top and sides of rung rails and rail guides	MPG
10	Water Way slip tubes	wipe clean/ wipe on	Wipe clean (NO SOLVENTS) wipe on	MO
11	Water Swivel and Wear Bands	grease zerks	Due Not Over Grease these zerks	MPG
12	Base Platform Leveling Cyl.	4 zerks	On each end of both cylinders	MPG
13	Platform Leveling Cylinders	4 zerks	On each end of both cylinders	MPG

### LUBE TYPES


MPG - A multi purpose grease that is water resistant and anti seize protectant under high loads

MO - SAE 10 Motor Oil

GL - 80W-90 Gear Oil

WRL - Wire Rope Lube

## Load Chart

		<b>MODEL NUMBER</b> <b>3S-1000-102-TA-RM</b>			
NOTES:	Water flow rating - 2000 gpm Nozzle range - sweep 90° left and right / Elevation 45° above platform				
<b>DISTRIBUTED LOAD CAPACITY (LBS)</b> <b>NO WATER FLOW - DRY / WITH WATER FLOW - WET</b>					
LADDER ANGLE	WATER CONDITION	LADDER SECTIONS			
		BASE	MID	FLY	PLATFORM
-12° to 10°	DRY	0	0	0	1000
	WET	0	0	0	500
11° to 20°	DRY	0	0	0	1000
	WET	0	0	0	500
21° to 30°	DRY	250	0	0	1000
	WET	0	0	0	500
31° to 40°	DRY	250	0	0	1000
	WET	250	0	0	500
41° to 50°	DRY	500	250	0	1000
	WET	250	0	0	500
51° to 60°	DRY	500	500	250	1000
	WET	250	250	0	500
61° to 70°	DRY	750	750	500	1000
	WET	500	250	250	500
71° to 80°	DRY	750	750	750	1000
	WET	500	500	250	500

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***ROSEANN F. TUREK,***

***Technical Writer***

**Engineering Office  
One Industrial Complex  
Nesquehoning, PA 18240**

***(800) 235-3928, Ext. #5281***