ELLIOTT HI-REACH
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HI-REACH OPERATING PROCEDURES

The purpose of this section is to provide the user with the basic operating procedures essential for proper machine operation for its intended purpose.

The user of the Elliott aerial lift should not accept operation responsibility until the operator's manual has been read and understood, and should initially operate the Elliott aerial lift under the supervision of an experienced and qualified operator.

Some of the items described may not apply to your Elliott Hi-Reach, please read carefully and note that instructions regarding optional items are noted in brackets.

If there is a question on application and/or operation, contact the Product Safety and Reliability Department at Elliott Equipment Company

This section is divided into nine parts as follows:

Part 1 - The Walk around Inspection
Part 2 - Functional Check of Lower Controls
Part 3 - Functional Check of Platform
Part 4 - Operation of Aerial Lift
Part 5 - Functional Check of Crane
Part 6 - Operation of Crane.
Part 7 - Operation of Digger
Part 8 - Operation of the Tool Circuit
Part 9 - Additional Information

WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY LABELS
BEWARE OF OVERHEAD POWER LINES
REFER TO PLATFORM CAPACITY LABEL AND CRANE LOAD CHART

1. THE WALK AROUND INSPECTION

a) Frequency

Each day, prior to the operation of an Elliott Hi-Reach, complete a walk around inspection and operation check. These should be a common practice for any safety conscious equipment operator. If any problems are found, refer to the Maintenance section for proper action.

b) Vehicle Inspection

Position the vehicle in a convenient position or in the position appropriate for performing work after the inspection and functional check. Perform all items required in a standard walk around inspection in accordance with US DOT Commercial Vehicle Requirements. Verify that the loaded vehicle does not exceed the Gross Vehicle Weight Rating or create axle loading exceeding state law or the Gross Axle Weight Ratings of the vehicle.

c) Platform Inspection

Check the Hi-Reach personnel platform for visible damage. Also check for loose or broken bolts or lock pins which secure the platform to the boom and slave leveling cylinders. Make sure that the pins and pivot trunnion bearing are properly lubricated. Check the hydraulic hoses and control cables (or fiber optic conductor), from the platform controls down through the cable carrier. Be sure the cable clamps are in good position to secure the hoses and cables and that they are in good working order.

d) Platform Control Inspection

Inspect the safety chain (or rope) on the platform entrance to ensure it latches properly. Inspect for loose or missing parts. The foot switch for electric controls (or the finger switch for fiber optic controls or the trigger valve for full hydraulic controls) should be in good working order. This safety feature must not be modified, disabled or blocked. The controls should be clearly marked and show no visible damage. The information and operation placards here, as in all other areas, must be in place and free of dirt and debris so they can be easily read and understood. The switches and levers should be properly secured and the boom control levers should return to neutral or center position when released.

e) Bearing & Boom Inspection

Check that the turntable bearing and pinion are not damaged and have no loose or missing hardware and check for proper lubrication and no evidence of loose bolts or looseness between the bearing and the structure.

Inspect the boom pivot pin and lift cylinder pins for wear and alignment. The pins should be lubricated properly. Boom sections should be free of physical damage. Check the wear pad for proper shimming. Make sure all bolts are in place and tight.

f) Outrigger Inspection

Check all outriggers (including the front bumper jack making sure the front bumper jack is properly pinned in position).

g) Under Vehicle Inspection

Perform a thorough visual inspection of the unit's underside. Checking this area often results in discovery of conditions that could cause extensive machine damage brought on by hydraulic oil leaks.

h) Hydraulic System Inspection

Inspect the sight gauge to ensure it shows the proper level of oil in the tank. The level should be checked with cold oil, system shut down and the boom in stowed position. The hydraulic tank and oil filter housing should be secure and should be free of leaks. The hydraulic oil breather should show no signs of overflow or clogging.

i) **Conclusion of Walk around Inspection**

To avoid injury, do not operate the machine until all the above items have been inspected and corrections made if necessary. Use of an aerial lift without making the necessary corrections is a safety violation. Do not operate the unit unless it has been serviced and maintained according to the manufacturer's specifications and schedule.

2. FUNCTIONAL CHECK OF LOWER CONTROLS

a) **Set-Up Procedures**

Be sure the unit is in an area free of overhead and ground level obstructions. To insure proper safety when working in roadway or traffic be sure you use all needed barricades and barriers. If unit is not an insulating model, keep clear of power lines.

A non-insulating machine does not provide protection from contact with or proximity to an electrically charged conductor. Maintain a clearance of at least 10 feet between any part of the aerial lift and its load and any electrical line carrying up to 50,000 volts. One foot of additional clearance is required for every additional 30,000 volts or less. Set-up in such a manner as to allow for the boom to sway, rock or sag and for movement of the hoist line and electrical lines due to wind.

If the unit is an insulating model as indicated on the data plate, verify that it has been tested within the time period specified by applicable regulation or company policy, and at least within the last twelve months. Do not operate an insulating unit near power lines if it has not been tested within the past twelve months. Insulating boom vehicles must not be used near power lines with a higher voltage than the designed voltage of the aerial lift. When working on or near energized lines, follow all company policies and applicable regulations. An insulating boom provides no protection from line to line (phase to phase) contact or contact between a line (phase) and a ground.

Verify that the parking brake is set. In addition to the parking brake, units without outriggers must have the special brake-lock set per the instructions in the cab. Shift transmission to neutral and start engine. Check all gauges. Using instructions provided in the cab, engage the Power Take Off (PTO) to start the Hi-Reach hydraulic pump. Note, the PTO must not be engaged when the vehicle is moving. Switch the master switch on to provide power to the Hi-Reach to permit pressurizing the hydraulic system.

Once the pump is running and the hydraulic fluid is warm, check the multi-color dirty-filter pressure gauge on the return filter between the valves and the hydraulic reservoir. Make this check with the HI-Reach throttle control on the high position. This pressure gauge must have the needle in the green area. Never operate the unit with the indicator in the red area as this indicates the filter element is plugged and the filter is in by-pass mode and dirt is being circulated through the system. Also check the dirty filter pop-up red indicator on the pressure filter between the pump and the valves. If the pressure filter indicator shows a red band, stop the engine and press the reset button to the side of the red band to reset the indicator. This will hide the red band and then start the unit and recheck. If either filter shows that the element is dirty, replace both filter elements and also clean the suction strainer located between bottom of the reservoir and the and the pump inlet.

Read and understand all warning, caution and notice labels at the lower controls. Verify the selector is positioned for lower controls.

b) **Set Outriggers**

If the unit is not on firm ground, place ground boards of suitable size under the outrigger pads. This will help distribute the weight of the unit, making it more stable. Do no set outriggers on snow, ice, crushed rock or soft ground.

The main outriggers located alongside the turret must be set first. Check that all personnel and other obstructions are clear of the outriggers and, while watching under the vehicle, extend and lower both of the main outriggers until they lift the vehicle frame (at the location of the outrigger) approximately four inches. The outriggers must be firmly set. If not set firmly, rotating the boom may cause the outriggers to shift, resulting in bent or damaged outriggers, and an unsafe condition.

Note, out-and-down main outriggers must be fully extended before lowering the legs. The green stripes on all inner horizontal (in and out) legs must be visible to indicate full extension (GO) before lowering the vertical (up and down) legs.

Likewise both "A" outrigger legs must be extended to the green (GO) stripe to indicate adequate width between the outrigger shoes. Note, if the unit is set up on a side slope, the upper leg of the "A" outrigger must still be extended to the stripe to prevent the unit from becoming unstable to the up-hill side. Use cribbing under the down-hill leg if necessary.

Check the level bubble on the lower control panel bottom to ensure the bubble is centered right-to-left. Adjust the outriggers down on the side away from where the bubble is resting until the bubble is centered right-to-left.

Move to the secondary outrigger control valve (on units so equipped) and extend and lower the secondary outriggers while watching to ensure that neither outrigger shoe is coming down on any obstruction. Note, out-and-down secondary outriggers must be fully extended to the green stripe before lowering the legs. Both "A" outrigger legs must be extended to the green stripe. When the unit appears level front-to-rear, check the level bubble. Continue to adjust until the bubble is in the center of the indicator.

Lower the front stabilizer (on units so equipped) while watching under the vehicle to prevent lowering onto an obstruction until the front of the vehicle starts to lift.

It is extremely important to recheck that all outriggers are on a firm surface and some portion of the bubble is within the center mark of the level indicator. If the bubble is not in the center of the level, raise the front stabilizer (on units so equipped) and the secondary outriggers (on units so equipped) and reset the main and then the secondary outriggers. Always set front stabilizer last.

c) **Pre-Operational Check From Boom Ground Controls.**

Pull out the slide-away step (on units so equipped) and always operate the boom from the step provided. This will preventing the operator from becoming an electrical path to ground if the unit accidentally becomes electrically charged. Check overhead clearance and operate boom up to the horizontal position and rotate to a clear area. Check clearance, then telescope out. With the boom out, check that the boom is not rusty and is coated with a light oil film. There should be no hoses or cables hanging out of the cable carrier as this will cause damage or a possible leak in these components. Upon completing this check, retract the boom.

Before operating boom rotation, check to see that there is adequate clearance. Operate swing left and right. Then center the boom and operate boom down to restore the boom to the boom stand. Move the ignition switch to the off position until the engine stops. Turn on the 12-volt emergency pump (on units so equipped) and raise and lower the boom a few inches to test the 12-volt emergency pump. Restart the vehicle engine and test the motor speed control by moving the switch up (momentarily) and down (hold). Finally, test the horn (if so equipped). Test other optional systems that your unit may have such as remote platform rotation, bucket rotation, jib winch or jib rotation.

d) **Purge and Re-Level Platform Leveling System**
Raise the boom to the horizontal position and operate the leveling valve in both directions to circulate the oil in the closed leveling system and to purge air from the system. Re-level the platform. Stop the vehicle engine and return the switch to run (center) position.

3. FUNCTIONAL CHECK OF PLATFORM

a) **Set-Up Procedures**
Check the data plate at the lower controls for the platform weight rating (and insulating rating of the boom). Check on the lower control panel that the switches are in "upper controls" position, the "engine speed" switch is in the center "idle" position and the engine switch is in the center "run" position. The "off" position will prevent the engine from starting from the platform (or from the cab with the "Master Switch" "on").

b) **Platform Controls**
Read and understand all warning, caution and notice labels at the platform. Attach the safety harness lanyard to the labeled anchorage loop. Make sure the lanyard length is proper for the job. On units so equipped, Attach the closure chain (or rope) across the platform opening. On units with a rotating platform, check that the travel locking pin is engaged and the rotation handle pin is also engaged. On units equipped with an EaZily Removable platform, check that the spring-loaded attachment pin is secure and that the safety pin is in the locking hole.

To operate the multi-lever electronic upper controls (on units so equipped), the locking collar must be lifted up in order to move the individual electronic control levers in either direction. When the control lever is released, it should automatically return to the neutral or off position. Multi-axis controllers on fiber optic systems or full hydraulic upper controls must be tested to see that they return to the center neutral position when released. The foot switch with multi-lever electronic upper controls (or finger switch on multi-axis fiber optic systems or the enable collar on multi-stick fiber optic controls or trigger valve on full hydraulic controls) must be actuated before any controls will function and it provides an emergency stop means when the operator releases the switch (enable collar or trigger valve) thus stopping all control functions. **Do not block or disable this safety feature in any way.**

Test the platform controls. First check overhead and side to side clearances. For units with electric controls or fiber optic systems, leave the platform master switch "off" and the foot switch (enable collar or finger switch) not depressed, "start" the engine. Slowly try engine speed, boom "up", boom "right", boom "out". None of these should function. Turn the platform master switch "on" and slowly try engine speed, boom "up", boom "right" and boom "out." None of these should function. On units with electronic or fiberoptic controls, turn the master switch "on". Double check overhead clearance, activate the foot switch (enable collar, finger switch or trigger valve) and very slowly operate "boom up" until the boom is level. Double check side clearances and test boom right and boom left. Check rear clearances and test boom out and boom in. Test the boom "down" while watching under the boom.

c) **Remote Re-leveling**
Test the remote platform leveling. Activate the foot switch (enable collar, finger switch or trigger valve) and briefly operate platform leveling "in" and then platform leveling "out" (or "up/down"). Return the platform to the level position.

d) **Platform Rotation**

For units equipped with a rotating platform, test the platform rotation mechanism. Lift the travel locking pin on units so equipped to disengage it and latch it in the unlocked position. For manual rotation, lift the rotation handle to disengage the handle lock and rotate the platform to each extreme. For units with an electric platform rotation switch, step on the foot switch and operate the rotate platform switch to rotate to each extreme. For full hydraulic platform rotation, squeeze the trigger valve and operate the platform rotation lever to rotate the platform to each extreme. Re-center platform, lower rotation handle to lock it on units with manual rotation and then re-engage the travel locking pin.

e) **Emergency Pump**

On units equipped with 12 volt emergency pump, stop engine, turn on emergency pump and raise and lower boom to test emergency pump. Turn off emergency pump.

4. AERIAL LIFT OPERATION

a) **Personal Protection Equipment**

No operation is permitted without an approved safety harness. According to federal OSHA regulations, all personnel in the platform shall wear a safety harness with an energy absorbing lanyard attached to the lanyard attachment point. Elliott also recommends that approved headgear be worn by all operating and ground level personnel. Your head is the highest point when operating an aerial platform. The user is responsible for complying with all applicable laws and regulations. Get exact wording and requirements as they apply to your work and the personal protection gear required to perform your work.

b) **General Safety Considerations**

Precaution to avoid all hazards in the work area must be taken by the operator and his supervisor before starting to work. Check the clearances above, to the sides and the bottom of the platform when raising lowering and swinging the boom. The operator is responsible to avoid operating over ground personnel and to warn them not to work, walk or stand under a raised platform. Never use the boom for any purpose other than positioning personnel, their tools and equipment or lifting a load. Base controls are never to be used for positioning with personnel in the aerial work station, except in case of emergency as required by law, due to the hazard this practice presents to personnel. Be certain to never exceed the manufacturer's rated platform capacity as shown on the capacity decal. Distribute the load evenly on the platform floor. If a capacity decal is not present or not legible, do not operate the unit. When working for an extended length of time in one platform position, turn "off" platform master switch and turn "off" vehicle engine.

Never position ladders, steps or other items on the unit to provide additional reach for any purpose. Keep mud, oil, grease and other slippery substances cleaned from footwear and the platform deck. When riding in, or working from the platform both feet must be firmly positioned on the deck. Lower controls are not to be used to position personnel in the platform. Platform personnel shall position the platform using the upper controls as required by OSHA paragraphs 1910.67 (General Industry) and 1926.556 (Construction).

A high degree of caution must be exercised when operating this equipment in wind. Due to variations in conditions having to do with grade, direction of wind, material suspended from the boom and other factors, it is impossible to state an absolute maximum wind speed for the safe operation of the equipment. All warnings and instructions in this manual pertaining to proximity to electrical lines and stability of the unit should be observed. In higher winds, a higher degree of caution must be exercised with regard to all such warnings and instructions. Operation of the equipment at any wind speed above 30 miles per hour must be reviewed and approved by supervisory personnel and **extreme caution** must be exercised. Failure to heed these warnings may result in serious personal injury or death.

Maintain a safe clearance from electrical lines. If the machine is not an insulating model, it does not provide protection from contact with or proximity to an electrically charged conductor. Maintain a clearance of at least 10 feet between any part of the aerial lift and its load and any electrical line carrying up to 50,000 volts. One foot of additional clearance is required for every additional 30,000 volts or less. Set-up in such a manner as to allow for the boom to sway, rock or sag and for movement of the electrical lines due to wind.

If the unit is an insulating model as indicated on the data plate, verify that it has been tested within the time period specified by applicable regulation or company policy, and at least within the last twelve months. Do not operate an insulated unit near power lines if it has not been tested within the past twelve months.

Insulating boom vehicles must not be used near power lines with a higher voltage than the designed voltage of the aerial lift. When working on or near energized lines, follow all company policies and applicable regulations. An insulated boom provides no protection from line to line (phase to phase) contact or contact between a line (phase) and a ground line.

Stability of the aerial device depends largely upon the working surface. Therefore, only firm, level surfaces are acceptable for elevated operation. Do not operate the unit near ditches or on muddy or unsolid ground. If operating the machine on grades and side slopes exceeding five degrees, the outriggers must be cribbed with suitable material to allow for leveling. The unit must always be positioned to allow the unit to be re-leveled so that the level bubble is within the center marks. At no time can the unit be operated with the turret box more than two degrees out of level in any direction.

c) **Operation**

The functions controlled by the control levers should be operated smoothly by moving the control with a slow even motion until the hydraulic system audibly starts to build up pressure. After movement has started, gradually move the controller to the desired speed. The speeds of these functions are variable from zero to maximum, depending on the position of the control lever. Never slam a control lever through neutral to the opposite direction. Return the control slowly to neutral, stop, and then proceed. Never operate the unit with your hands over the platform rail, to avoid crushing injury.

d) **Completion of Operation**

When the operation of the aerial lift is completed, retract the boom and lower the boom to the boom rest while watching for obstructions under the boom including other workers, the vehicle cab, lower controls, ladder grab handles and the edge of the bed. Move the engine switch to the "off" position until the engine stops. Leave the engine switch in the "off" position as long as you occupy the platform. This prevents draining the battery with truck components such as the hydraulic brake pump. Always move the switch to the center, "run" position before leaving the platform. Failure to do this will prevent starting the engine from the lower controls or truck cab. Turn the platform master switch "off" and double check that the engine switch is not in the "off" position.

5. FUNCTIONAL CHECK OF OPTIONAL TURRET CRANE

a) **Inspection**

Inspect the winch, level wind assembly and winch cable guides. Start the vehicle engine at the lower controls. Recheck all outriggers set during functional check of lower controls in Part 2.

b) Reeve Load Line

Operate the winch "down" to loosen the load hoist line from its retainer spring by operating the winch down lever. Have a helper unhook the load hoist line hook and string it over the top boom guide and extend the line four feet beyond the sheave head. Remove the sheave head retainer pin and place the line on the sheave so the retainer can be replaced. Check the hook and safety latch and attach the cable hook to the top bolt of the snatch block or the top thimble of the down-haul ball. Models with 2,000# winch have a down-haul ball only. Models with larger winches have a snatch block. Models 56' and larger with winches over 2,000# have both a snatch block and a down-haul ball. If no down-haul ball is provided, the snatch block is the down-haul weight for single line operation. Check the snatch block or down-haul ball hook and safety latch.

c) Rig the Anti-2-block Switch

On units with a lifting capacity over 2,000#, the anti-two-block switch and weight must be connected. Holding the anti-two-block switch override flag tight against the switch, pull down on the cable and pull it out of the slot on the flag. Store the override flag on the switch with the tabs provided. With the attaching link provided, attach the anti-two-block weight to the switch. Pull the two retainers to split the weight and place it around the winch load hoist line. The load line is now reeved for single part line operation.

By reeving the load line for two-part operation the lifting capacity of the winch and load line is doubled and the lifting speed is reduced 50%. Be sure not to exceed the load chart for each boom length and angle. To reeve the load line for two-part operation first remove the down-haul ball or snatch block from the load line. Connect the load line hook to the shackle under the boom. Open the snatch block and place it over the winch line. If provided, connect the down-haul ball top thimble to the hook on the snatch block. Inspect the hook and safety latch on both the snatch block and down-haul ball.

Check the cable for any abrasion, kinks, breaks and even, level wrapping on winch spool. Check that the load hoist guide rollers on the top of the boom are free to roll with the cable. Also check that the sheaves are lubricated and free to rotate under load.

d) Test The Anti-Two-Block System

The anti-two-block system must be functioning properly prior to using the crane. Raise the boom to the level position. Slowly extend the boom while watching the hook rise. When the anti-two-block weight is contacted, the hook should stop, protecting the sheave head, load line and hook from damage. At this point three boom functions should be inoperative. Test boom "down", boom "out" and winch "up". None of these should cause the hook to jam into the sheave head.

6. CRANE OPERATION

a) General Safety Considerations

Precaution to avoid all hazards in the work area must be taken by the operator and his supervisor before starting to work. Check the clearances above, to the sides and the bottom of the platform when raising lowering and swinging the boom. The operator is responsible to avoid operating over ground personnel and to warn them not to work, walk or stand under a raised boom. Be certain to never exceed the rated crane capacity for each boom length and angle per the attached load chart. If a load chart decal is not present or is not legible, do not operate the unit. Most Elliott load charts are shown with the platform removed. If the platform is on the boom, reduce the allowable lift capacity by the appropriate amount shown on the load chart.

Like the aerial lift, a high degree of caution must be exercised when operating the crane in wind. Due to variations in conditions having to do with grade, direction of wind, material suspended from the boom and other factors, it is impossible to state an absolute maximum wind speed for the safe operation of the equipment. All warnings and instructions in this manual pertaining to proximity to electrical lines and stability of the unit should be observed. In higher winds, a higher degree of caution must be exercised with regard to all such warnings and instructions. Operation of the equipment at any wind speed above 30 miles per hour must be reviewed and approved by supervisory personnel and **extreme caution** must be exercised. Failure to heed these warnings may result in serious personal injury or death.

Maintain a safe clearance from electrical lines. Even on insulating machines the rope load line is not considered insulating and it does not provide protection from contact with or proximity to an electrically charged conductor. Maintain a clearance of at least 10 feet between any part of the aerial lift and its load and any electrical line carrying up to 50,000 volts. One foot of additional clearance is required for every additional 30,000 volts or less. Set-up in such as manner as to allow for the boom and load line to sway, rock or sag and for movement of the electrical lines due to wind.

If the unit is insulating as indicated on the data plate, verify that it has been tested within the time period specified by applicable regulation or company policy, but at least within the last twelve months. Do not operate an insulated unit near power lines if it has not been tested within the past twelve months. Be sure the fiber rope on insulated units is clean and dry.

Insulating boom vehicles must not be used near power lines with a higher voltage than the designed voltage of the aerial lift. When working on or near energized lines, follow all company policies and applicable regulations. An insulated boom provides no protection from line to line (phase to phase) contact or contact between a line (phase) and a ground line.

Stability of the crane depends largely upon the working surface. Therefore, only firm, level surfaces are acceptable for elevated operation. Do not operate the unit near ditches or on muddy or unsolid ground. If operating the machine on grades and side slopes exceeding five degrees, the outriggers must be cribbed with suitable material to allow for leveling. The unit must always be positioned to allow the unit to be re-leveled so that the level bubble is within the center marks. At no time can the unit be operated with the turret box more than two degrees out of level in any direction.

Prepare a plan for the lifting operation and review it with all parties involved. Know the weight of the objects being lifted. If they exceed the single part line limit as shown on the load chart, two-part the hoist line. Make all crane movements slow and smooth both starting and stopping the movement to avoid causing the load to swing.

Start and stop winch movements slowly and smoothly by metering the hydraulic valve. Move the valve handle or electronic control handle (on units so equipped) slightly until the hydraulic pressure builds as indicated by the pressure gauge or the sound of the hydraulic pump. Two-speed winch (on units so equipped) should be started in low speed. To shift to low speed move the valve or switch to the "low speed" position.

b) Platform Removal

The load chart for the crane may be specified for use with the platform removed. Subtract the listed platform weight from the permitted lifting capacity if the platform is not removed. To remove the top-mounted platform, use the lower controls and lower the boom to about 24" above the ground. Then use the platform leveling valve to rotate the platform out away form the boom and lay the platform on the ground on its rear rails. Disconnect the leveling cylinder pins, the electrical connector and any other accessory lines to the platform. Then remove four nuts to release the platform trunnion bearing caps. Then using the lower controls, pull the boom away from the platform. Be sure to operate the leveling system to retract the leveling cylinders to the position they were in prior to rotating the platform.

7. DIGGER OPERATION

a) General Safety Considerations

Precaution to avoid all hazards in the work area must be taken by the operator and his supervisor before starting to work. Check the clearances above, to the sides and the bottom of the boom when raising, lowering and swinging the digger. The operator is responsible to avoid operating over ground personnel and to warn them not to work, walk or stand under a raised boom.

Maintain a safe clearance from overhead electrical lines and contact the appropriate authorities to locate underground utilities so that they may be avoided while digging. Maintain a clearance of at least 10 feet between any part of the aerial lift and its load and any electrical line carrying up to 50,000 volts. One foot of additional clearance is required for every additional 30,000 volts or less. Set-up in such as manner as to allow for the boom and digger to swing or rock and for movement of above-ground electrical lines due to wind.

Stability of the digger vehicle depends largely upon the working surface. Therefore, only firm, level surfaces are acceptable for elevated operation. Do not operate the unit near ditches or on muddy or unsolid ground. Do not operate the machine on grades and side slopes exceeding five degrees. The unit must always be positioned to allow the unit to be re-leveled so that the level bubble is within the center marks.

b) Operation

Prepare a plan for the digging operation and review it with all parties involved. Begin by positioning the vehicle such that the locations of the holes to be dug are within the digging radius of the machine. Start the PTO per the instructions above including the second "auger PTO" (on units so equipped). Place the upper/lower control in the "lower" position. Set all outriggers per the preceding instructions. Verify that the boom is fully retracted and place the boom extension mode control in the "auger" mode. Two-speed auger drives (on units so equipped) should be started in low speed. To shift to low speed move the valve or switch to the "low speed" position. Check for overhead clearances and move any personnel that are near the boom. Raise and rotate the boom to a position that will allow the auger to hang vertically from the boom. You are now ready to lower the auger into the digging position. Slowly and very carefully operate the auger momentarily in the "clock-wise direction to tension the auger lift rope and lift the auger from the latch. Now operate the latch control handle to retract the latch and then slowly operate the auger counter-clock-wise to the vertical digging position. Continuing to rotate the auger will automatically release the auger stow rope from the auger so that you are ready to dig. Using the boom controls at the lower control station or at the remote control box (radio or hard-wired), position the auger over the hole location and lower the boom until the auger head just contacts the ground. Note, with the boom extension in the "auger position" the upper boom(s) will not extend when extending the boom, only the second stage with the digger will extend. Start digging by engaging the auger "clock-wise" control and then use the boom controls to maintain the digger in a vertical position and to maintain a slight down pressure on the auger. Utilize the high engine speed and the auger two-speed control (on units so equipped) to control the digging speed. Depending on the auger size, depth of hole and the type of soil, the auger may need to be frequently pulled out of the hole to unload the material from the auger.

After completing the digging operation at one position, re-stow the auger before moving the vehicle. Using the controls at the lower control station, retract the boom and attach the stow rope to the hook on the auger. Raise the boom and slowly operate the auger in the clockwise direction to slowly lift the auger to the stow bracket. Be sure to watch for contact between the auger and the bracket as the auger approaches the stow bracket to avoid breaking the stow rope. When the auger is above the latch, operate the latch handle to extend the latch. Rotate and lower the boom to the boom stowage position on the vehicle bed. Before moving the vehicle inspect the latch to verify that it is fully extended under the auger.

8. TOOL CIRCUIT OPERATION

The tool circuit consists of an on/off control, an adjustable flow control and one or more sets of pressure and return (tank) quick disconnects. If quick disconnects are located in the platform, there will be a tool circuit control in the platform as well. Before using the tool circuit, locate the adjustable flow control and determine the desired flow rate for the tool to be used. The flow control is labeled 0 to 10 which represents 0 to 100% of the hydraulic system flow which is normally 7 GPM at engine idle and 14 GPM at high engine speed. For 5 GPM flow set the flow control at 7 and operate the engine at idle speed for 70% of 7 GPM. Connect the open-center tool to the quick disconnects before turning "on" the tool circuit. **Running the tool circuit with no open-center tool connected, will dead-head full system pressure in the tool pressure line popping the system relief and generating excessive heat.**

9. ADDITIONAL INFORMATION

If the unit is equipped differently than those shown in this presentation or in the operating manual, contact an authorized Elliott distributor in your area or contact Elliott Equipment Company for proper operating instructions.